DOCUMENT RESUME

ED 247 933 IR 050 810

AUTHOR	Cheney, B. J., Ed.
TITLE	Information Management. VALA National Conference on Library Automation Proceedings (2nd, Melbourne, Australia, November 28-December 1, 1983). Volume 1.
INSTITUTION	Victorian Association for Library Automation, Melbourne (Australia).
REPORT NO	ISBN-0-908478-06-2
PUB DATE	84
NOTE	250p.; For Volume II, see IR 050 811.
AVAILABLE FROM	Victorian Association for Library Automation, GPO Box 2342V, Melbourne, Victoria, Australia 3001 ($25.00 per 2 volume set, ISBN-0-908478-05-4).
PUB TYPE	Collected Works - Conference Proceedings (021) -- Viewpoints (120) -- Reports - Descriptive (141)
EDRS PRICE	MF01/PC10 Plus Postage.
DESCRIPTORS	Computers; Databases; *Information Networks; Information Retrieval; *Information Systems; Librarians; Libraries; Library Associations; *Library Automation; *Technological Advancement; Technology; Telecommunications
IDENTIFIERS	*Australia; Bibliographic Data Bases; Electronic Publishing; *Information Management; Information Policy; Online Catalogs; Private Sector; Public Sector

ABSTRACT

The first of two volumes of a conference proceedings, this document contains the welcome, the opening, the keynote addresses, and the invited papers, as well as a submitted paper by John Gillam which was not available for publication in the pre-prints (Volume 2) prior to the conference. Three addresses are not included in these proceedings and three papers are edited transcripts of the tapes. The 17 papers include: M. Beckman, "Management of Information Systems in a Network Environment"; M. Wigan, "Electronic Publishing and Technical Communications: A User's View"; T. Mays, "Public Access Catalogues"; P. Judge, "Public Sector/Private Sector Interaction in Australian Information Policy"; J. Davidson, "Australian Telecommunication Services"; R. Allen, "Public Information Systems in Australia"; I. Reinecke, "Unbottling the Genie"; M. Findlay, "Constructing National Databases--A Centralized Operation"; B. Forbes, "The STREAMLINE Perspective"; J. Gillam, "Developing the Satellite Options for Libraries"; K. Ziebell, "Customer Guidelines in the Choice of Telecom Data Products"; H. Russell and M. Irvine, "Development of Regional Information Systems"; I. McCallum, "New Products and Appropriate Technology"; K. Alder, "School Libraries and Computers"; E. Morrison, "Technology, Librarianship and Information Management"; M. Beckman, "On-line Catalogue Development: The Guelph Experience"; and G. Jackson, "CSIRO/VALA Technical Workshop on Microcomputer-Based Information Retrieval Packages." (DMC)

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

ED247933

VALA '83

SECOND NATIONAL CONFERENCE ON LIBRARY AUTOMATION

INFORMATION MANAGEMENT

PROCEEDINGS
Volume 1

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

B.J. Cheney

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

TROSBIO

VICTORIAN ASSOCIATION FOR LIBRARY AUTOMATION

VALA SECOND NATIONAL CONFERENCE ON LIBRARY AUTOMATION

"Information Management"

Proceedings

Volume 1

28th November - 1st December, 1983
Medical Centre, University of Melbourne
Melbourne, Australia

Editor: B. J. Cheney
(Systems and Development Group,
Central Information, Library &
Editorial Section, C S I R O)

PROGRAMME COMMITTEE

Leigh Baker	Tony Mays
Barry Cheney	Geoff Payne
Virginia de Crespigny	David Richards
Hans Groenewegen	Doug Savige
Diana Killen	

Victorian Association for Library Automation
GPO Box 2342V, Melbourne, Victoria 3001

IR050810

© 1984, Victorian Association for Library Automation

General permission to reprint, but not for profit, all or any part of this matter is granted, provided that the Victorian Association for Library Automation's copyright notice is given, and that reference is made to the publication, to its date of issue, and to the fact that reprinting privileges were granted by permission of the Victorian Association for Library Automation.

National Library of Australia Cataloguing-in-Publication Entry

VALA National Conference on Library Automation (2nd: 1983: University of Melbourne).

Information Management

ISBN 0 908478 05 4 (set)
ISBN 0 908478 06 2 (v.1)
ISBN 0 908478 07 0 (v.2)

1. Libraries - Australia - Automation - Congresses. I. Cheney, B.J. (Barry J.). II. Victorian Association for Library Automation III. Title

025'.02'02854

Printed by
PINK PANTHER, Melbourne

Preface

The proceedings of the VALA 2nd National Conference on Library Automation are published in two volumes, as follows.

Volume 1 contains the welcome, the opening and keynote addresses, and the invited papers, as well as a submitted paper (Gillam) which was not available for publication in the pre-prints (Vol. 2) prior to the Conference. It was the policy of the programme committee to publish the invited papers after the Conference in order to allow the invited speakers the opportunity of developing their papers at some length and of being able to address issues as they arose during the Conference itself. For this reason several papers were not included in the pre-prints.

Volume 2 contains the preprints of the submitted papers which were available at the time, and was distributed prior to the Conference.

Some addresses are not included in these proceedings (Chachra, Plustwick, Quinn) since they were not received by the publication deadline. Some papers are edited transcripts of the tapes; these are indicated by an asterisk (*) following the title on the Contents page. The paper by Grahame Jackson is a compiled report of the VALA/CSIRO Microcomputer workshop which was held in conjunction with the main Conference, and it is included here for completeness.

VALA is grateful to all contributors for making their papers available for publication. The editor acknowledges, with thanks, the help given in preparing the talks.

Views and opinions expressed in the published papers are those of the individual authors, and should not be taken to necessarily represent the views and opinions of VALA or the organizing committee. It should be noted in particular that the paper by Gillam expresses a personal viewpoint.

Acknowledgments

VALA expresses its thanks to the following organizations for their assistance in the conduct of the Conference.

ACI Computer Services
CAVAL Ltd.
CSIRO
Genasys II P/L
Hans Zwillenberg and Associates
IDAPS Australia Ltd (Libramatic Division)
Infoquest Ltd.
LaTrobe University
Library Council of Victoria (Public Libraries Division)
PRIME Computers of Australia Ltd.
RMIT
St. Hilda's College
Techrilib
Telecom Australia
University of Melbourne
Victoria College

Volume 1 of the Proceedings of the VALA 2nd National Conference on Library Automation contains the invited papers. The TS number refers to the Technical Session at which the paper was presented.

CONTENTS

		Page
Preface		iii
Acknowledgments		iii
Foreword		vi
Robt. D. Williamson Award		vii
Conference programme		viii
Official welcome	David Richards, President of VALA	1
Opening Address	Margaret Beckman, Management of information systems in a network environment.	5
Keynote Address	Marc Wigan, Electronic publishing and technical communications: a user's view.	28
TS 3.1	Tony Mays, Public access catalogues.	43
Keynote address	Peter Judge, Public sector/private sector interaction in Australian information policy.	56
Panel:	James Davidson, Australian telecommunication services.	83
	Roger Allen, Public information systems in Australia.*	92
	Ian Reinecke, Unbottling the genie.*	96
TS 5	Margaret Findlay, Constructing national databases - a centralized operation.	103
	Beverly Forbes, The STREAMLINE perspective.	115
TS 6.1	John Gillam, Developing the satellite options for libraries.	125
	Kevin Ziebell, Customer guidelines in the choice of Telecom data products.*	135
TS 6.2	Hamish Russell and Margaret Irvine, Development of regional information systems.	141
Keynote address	Ian McCallum, New products and appropriate technology.	158
Panel:	Kate Alder, School libraries and computers.	192
	Elizabeth Morrison, Technology, librarianship and information management.	202
Open Address	Margaret Beckman, On-line catalogue development: the Guelph experience.	213
Workshop report	Grahame Jackson, CSIRO/VALA technical workshop on microcomputer-based information retrieval packages.	230

Foreword

In 1981 VALA convened the first National Conference on Library Automation. Its success indicated the need for future such Conferences of this type. This was further confirmed by the success of the present Conference. Indeed, as the Conference planning progressed, it became a focus for other activities in the information field, such as the launching of the 'Information Consultants, Freelancers and Brokers Directory', and the CSIRO microcomputer workshop, both of with which VALA was pleased to be associated. We were also particularly pleased to be honoured by international guests Margaret Beckman and Vinod Chachra.

Planning for the 2nd National Conference began in mid-1982. Many important developments were taking place in library and information automation. They included the availability of integrated library management systems, office automation systems, public-access catalogues, the arrival of powerful information-oriented microcomputers, the development of national information systems, and the enhancement of national telecommunications technologies. These developments had broadened the emphasis of traditional library and informational-retrieval activities which we felt, in framing the programme for the Conference, could now be viewed in the wider perspective of the management of information in its various forms. The Conference attempted to examine these developments in computer and communications technologies by addressing the issues at an international, national and a local level. The Conference was structured with one day devoted to each level.

During the Conference planning it became clear that some of the issues we wished to address were ramifying in unexpected directions. Others were not developing as rapidly as expected. Thus the change in the Government in 1982 led to rethinking of important national telecommunications issues such as the Davidson report on Telecom, and the continuing debate over control of the Australian domestic satellite. On the other hand, developments such as the Parliamentary library system moved slowly, with the result that the report on this system regrettably could not be given at the Conference. Nevertheless, developments such as these remain active issues for librarians, information scientists and computer professionals, and should be further addressed in future Conferences.

Acknowledgment is due to the following members of VALA who put in many hours of hard work in planning and managing the Conference.

Organizing Committee:

David Richards (President, from Aug 82)
Virginia de Crespigny (President, to Aug 82)
Barry Cheney
Graham Dudley
Elizabeth Oley
Leigh Baker
Tom Denison
Meredith Franklin
Geoff Payne
Doug Savige

Programme Committee:

Leigh Baker
Barry Cheney (Convenor)
Virginia de Crespigny
Hans Groenewegen
Diana Killen
Tony Mays
Geoff Payne
David Richards
Doug Savige

B. J. Cheney
Editor

Robt. D. Williamson Award, 1983

Mr Ian McCallum, of ACI Computer Services, was awarded the 1983 'Robt. D. Williamson Award', in recognition of his efforts in the development of AUSINET. The award also recognized Ian's work at the National Library with the Online ERIC project, and at ACI in new product development in the information management area, as well as his involvement with the Australian Database Development Association.

The certificate and a cheque for $550 were presented by Mrs Enid Williamson at the VALA Conference dinner, held at the Windsor Hotel.

The award is offered annually in commemoration of the late Bob Williamson, who played a pioneering role in the information science profession in Australia. The award is presented 'for outstanding contribution to the development of information science in Australia' and 'for demonstrated potential for positively influencing future developments in Information Science'.

Previous winners of the award were:
1981, Jim Gilmore, Manager, Systems and Development Group, CSIRO.
1982, Neil Speirs, of Australian Business Index.

PROGRAMME

VALA '83

SECOND NATIONAL CONFERENCE ON LIBRARY AUTOMATION

INFORMATION MANAGEMENT

Monday, 28th November
to
Thursday, 1st December
1983

MEDICAL CENTRE
UNIVERSITY OF MELBOURNE

VICTORIAN ASSOCIATION FOR LIBRARY AUTOMATION

G.P.O. Box 2342V, Melbourne, VIC. 3001

SUNDAY - NOVEMBER 27

Pre-Conference

4.00 - 8.00	Registration and informal welcome	StHC

MONDAY - NOVEMBER 28

INTERNATIONAL ASPECTS

8.30 - 9.30	Registration	MED
9.30 - 9.45	**WELCOME** David Richards, President of VALA	MED1
9.45 - 11.00	**OPENING ADDRESS** Margaret Beckman, University of Guelph	MED1
11.00 - 11.30	**MORNING TEA**	
11.30 - 12.30	**KEYNOTE ADDRESS** *Electronic Publishing and Technical Communications: A User's View* Dr. Mark Wigan, Australian Road Research Board	MED1
12.30 - 2.00	**LUNCHEON BREAK**	
2.00 - 2.45	**TECHNICAL SESSION 1** *Library Networking: Local and regional systems* Dr. Vinod Chachra, Virginia Polytechnic Institute	MED1
2.45 - 3.30	**TECHNICAL SESSION 2** *Information Management: Promises and Reality* Marianne Broadbent, Barry McIntyre, R.M.I.T.	MED1
3.30 - 4.00	**AFTERNOON TEA**	

4.00 - 5.00	MED1	4.00 - 5.00	MED3
TECHNICAL SESSION 3.1 *Public Access Catalogues* Tony Mays, Deakin University		**TECHNICAL SESSION 3.2** *Management Information from Library Systems* Elizabeth Spoor, W.A.I.T.	

TUESDAY - NOVEMBER 29

NATIONAL ASPECTS

9.30 - 10.30	**KEYNOTE ADDRESS** *The Public and Private Sector in Information Policy* Peter Judge, CSIRO	MED1
10.30 - 11.00	**MORNING TEA**	
11.00 - 12.30	**PANEL DISCUSSION** o James Davidson o Roger Allen, Computer Power o Ian Reinecke	MED1
12.30 - 2.00	**LUNCHEON BREAK**	
2.00 - 3.00	**TECHNICAL SESSION 4** *The Parliamentary Library System* John Brudenell, Parliamentary Librarian	MED1
3.00 - 3.30	**AFTERNOON TEA**	
3.30 - 4.30	**TECHNICAL SESSION 5** *Constructing National Databases: Two Perspectives* Margaret Findlay, Australian Council for Educational Research Beverly Forbes, Department of National Development	MED1

4.30 - 5.30	MED1	4.30 - 5.30	MED3
TECHNICAL SESSION 6.1 *Information Transfer Systems: Developing Options* Kevin Ziebell, Telecom John Gillam, Department of Communications		**TECHNICAL SESSION 6.2** *Development of Regional Information Systems* Hamish Russell, Margaret Irvine, Vic. Department of Agriculture	

5.30
A function at which Information Management and Consulting Group will launch their publication, *The Information Consultants, Freelancers and Brokers Directory*. (The venue will be announced at the Conference)

7.30 - 11.30	**Banquet at the Windsor Hotel, Spring Street, Melbourne**	

9.

WEDNESDAY - NOVEMBER 30
LOCAL ASPECTS

12.00 - 6.00 Technical Demonstrations — **LAB**

9.30 - 10.30 KEYNOTE ADDRESS — **MED1**
New Products and Appropriate Technology
Ian McCallum, ACI Computer Services

10.30 - 11.00 MORNING TEA

11.00 - 12.30 PANEL DISCUSSION — **MED1**
- Sherrey Quinn, Australian Road Research Board
- Kate Alder, Education Department
- Elizabeth Morrison, Monash University

12.30 - 2.00 LUNCHEON BREAK

2.00 - 3.00 — **MED1**
TECHNICAL SESSION 7.1
Integrated Information Management: Some Practical Considerations
Ray Welsh, S.E. Queensland Electricity Board

2.00 - 3.00 — **MED3**
TECHNICAL SESSION 7.2
Library Information via the Relational Data Model
Hermann Pfluetwik, La Trobe University

3.00 - 3.30 AFTERNOON TEA

3.30 - 5.30 — **MED1**
TECHNICAL SESSION 8.1
Vendor Presentation Panel
Brief presentations by vendors of library management systems

Including:

ADLIB
LRICA
DOBIS
BLIS
CLSI
VTLS

3.30 - 4.30 — **MED3**
TECHNICAL SESSION 8.2
Online Information Retrieval: Some Practical Experiences
Ann Wilson, Rosemary Cotter, Colleen Skinner, R. M. I. T.

4.30 - 5.30 — **MED3**
TECHNICAL SESSION 8.3
Models for Regional Library Cooperation
Frank Austin, AWA Computer Services

5.30 - 5.40 CLOSING ADDRESS — **MED1**
David Richards, President of VALA

5.40 for 6.00 Wine & cheese — **PLT**
VALA OPEN MEETING
Margaret Beckman, University of Guelph

THURSDAY - DECEMBER 1
Post-Conference

9 - 5pm Technical Demonstrations — **LAB**

9 - 5pm Technical Site Visits
Book at Conference Office

9 - 4pm Microcomputer Technical Workshop — **CSIRO**

5 - 7pm Closing social function — **StHC**

VENUES

MED	Medical Centre
MED1	Medical Centre, Lecture Theatre 1
MED3	Medical Centre, Lecture Theatre 3
LAB	Medical Centre, Laboratory W313
PLT	Public Lecture Theatre, Old Arts Building
StHC	St. Hilda's College, College Cres., Parkville
CSIRO	CSIRO, 314 Albert St. East Melbourne

CHAIRPERSONS

Monday

Opening	*David Richards, Telecom*
Keynote address	*Diana Killen, Infoquest*
TS1	*Doug Savige, Techlib*
TS2	*David Richards, Telecom*
TS3.1	*Geoff Payne, La Trobe Uni.*
TS3.2	*Elizabeth Orr, Libramatic Systems*

Tuesday

Keynote; Panel	*Jim Gilmore, CSIRO*
TS4	*Diana Killen*
TS5; TS6.2	*Leigh Baker, ACI Computer Services*
TS6.1	*Virginia de Crespigny, Victoria College*

Wednesday

Keynote Address	*Virginia de Crespigny*
Panel	*Doug Savige*
TS7.1	*Virginia de Crespigny*
TS7.2	*Barry Cheney, CSIRO*
TS8.1	*Hans Groenewegen, CAVAL Ltd.*
TS8.2	*Graham Dudley, Library Council of Victoria*
TS8.3	*Tom Denison, RMIT*
Closing: Open Meeting	*David Richards*

VICTORIAN ASSOCIATION

FOR

LIBRARY AUTOMATION

SECOND NATIONAL CONFERENCE ON LIBRARY AUTOMATION -- 1983

INFORMATION MANAGEMENT

OPENING REMARKS BY THE PRESIDENT

DAVID J. RICHARDS, B.A., A.R.M.I.T.

Senior Librarian, Telecom Headquarters Library, Clayton

Ladies and gentlemen!

On behalf of the Victorian Association for Library Automation I welcome you to the second national conference on library automation.

As the information society becomes a reality, and new patterns of information use emerge, libraries and traditional information-handling systems must be examined in an ever-widening context.

New demands have forced information systems to expand their capabilities dramatically and the boundaries of the information community have stretched to accommodate many new occupational groups.

Developments in computer and communications technology have radically transformed the cycle of information creation, storage, retrieval and dissemination, challenging many of the fundamental precepts on which existing approaches to the information cycle are based, and creating a host of problems for those charged with the maintenance of information systems and services.

Within this complex and rapidly-changing environment certain basic techniques and methods identify a commonality of interest which we can describe under the umbrella heading of information management.

Over the next three days our speakers will be examining many of the issues involved. We will begin with an overview of international developments in the area, progressing tomorrow to an examination of national information policies in the public and private sectors, concluding on Wednesday with discussions of various regional approaches to developments in information management.

During the conference, much of the discussion will revolve around machine-based operations. It is important to remember, however, that management of information in today's society must be a total concept, involving not merely the management of information in libraries, nor the management of digital information.

On the other hand, a total systems approach to information management does not mean the creation of monolithic systems designed to be all things to all people. It means simply an integrated approach to the entire range of systems necessary to support the effective and efficient transfer of information from producer to user.

We must never allow our concern for efficient information transfer to blind us to the fact that the ideas which live in the information we handle and manage are the things of real and lasting worth to our society and civilisation. Without due regard to ideas all the techniques we may develop for the effective management of information will be of no avail.

The issues involved are complex. Time at our disposal is short. Therefore to begin proceedings in earnest I introduce Mrs Margaret Beckman, Chief Librarian of the University of Guelph, Ontario, Canada.

Mrs Beckman has held this position since 1971. She has been a visiting lecturer in library building planning at the University of Western Ontario and at Queen's University, Kingston, Ontario. She has conducted seminars on library planning in Trinidad and lectured on the management of scientific information centres in the People's Republic of China in 1982.

She has served on many important committees and advisory boards in Canada as well as acting as a consultant to some 45 academic and public libraries and government agencies across the world. In addition, Mrs Beckman has published widely, most particularly in the fields of library buildings, library automation and library management. In 1975 Mrs Beckman was selected as one of 25 outstanding women of Ontario to be honoured in association with International Women's Year.

Mrs Beckman is, of course, no stranger to Australia, and Melbourne in particular. In 1975 she visited Melbourne as one of the guest speakers at the Library Association of Australia Biennial Conference in this city. Through that visit, and contacts with several Australian librarians in Canada, she has numerous friends here. I have no doubt that after this conference she will leave our country with many more.

Keynote Address

VALA, November 29, 1983

Management of information systems in a network environment

Abstract:

Changes in the Ontario university library network since 1975 are described and related to changes in the technological and social environment. The different responses of American and Canadian networks to that environment are outlined, and a description of a specific network experiment, iNET, is given. Finally, responsibility of the local library to future networks is defined.

Margaret Beckman
Chief Librarian
University of Guelph
Guelph, Ontario,
Canada

Management of information systems in a network environment.

I. Introduction.

It is eight years since I have been in Australia. In August, 1975, I addressed a general session of the Library Association of Australia's 18th biennial conference, and my theme was the cooperative approach to a library network or consortium. I described the problems which the group of 15 university libraries were experiencing in Ontario with that concept, and indicated the directions that we were attempting to pursue.[1]

There have been many changes to that consortium since 1975. The Ontario Council of University Libraries (OCUL) once more operates a very successful cooperative network, which includes among its projects:

- a union serials system (CUSS);
- Interlibrary lending, with NO verification based on the CUSS list;
- a cooperative document system (CODOC) which is accessible online or via COM/fiche catalogues;
- inter- university transit (IUTS);
- inter-university borrowing (IUBP) which allows graduate students and faculty members to borrow directly from each member library and return books at any location;
- a MAP cooperative system which produces a union list of atlases;
- a project to coordinate information services for handicapped students;

- a preservation/conservation project which concentrates rare book conservation in one library;
- a variety of statistical/management reports are produced annually;
- electronic messaging is about to be implemented in all 15 libraries and will be used for all ILL requests among OCUL (as well as general messaging).

However, unlike the cooperative consortium which I described in 1975, this network now operates without a central office, director, or even support staff. Each library has assumed responsibility for one project or another and manages the operation, finances, etc., on behalf of OCUL. Reports are given at semi/annual meetings and any changes in policy, or need for new or changed projects, are discussed at that time. The parent body for OCUL, the Council of Ontario Universities (COU) which consists of the presidents of our universities, is impressed by the fact that our network does not carry an administrative overhead and even calls on us for advice from time to time.

Let me not delude you into thinking that we have not had any problems since 1975. In fact, our problems were so horrific by 1979 that we despaired of survival. We had become involved in attempting a catalogue support service which would produce a union list of monographs jointly with the Quebec libraries - a project called UNICAT/TELECAT - which was based on the centralized bibliographic utility, UTLAS. The operation of UNICAT/TELECAT consumed more and more of the OCUL network resources, until by 1979 there was a staff of 11 for library coordination at the COU headquarters. All 15 libraries shared these staff costs, and some of us found the cataloguing system both more

expensive and less effective than local automated systems and subsequently withdrew from UNICAT/TELECAT. This of course resulted in dissension among OCUL members, and other projects - CODOC, CUSS, even ILL - began to suffer, as well.

Finally, in 1979, it was realized that we either changed methodology and direction or our whole network was going to be destroyed. Our solution was to disassociate ourselves from UNICAT/TELECAT and the coordinating office, and disperse the other projects as I described earlier. After a year or more of considerable discomfort in COU, the OCUL network was finally recognized in its new form; the central staff was dispersed; those libraries who wished to joined UTLAS directly, and the existing and new projects flourished. Most libraries moved to online local system for circulation, public access, acquisitions, and, more and more, for online catalogues, basically independent of any centralizing mechanism.

Is this Ontario experience typical or relevant? What has happened in the library/information environment since 1975 that has changed the network directions - not only in Ontario and in Canada but in other countries as well? What are the changes? What are the trends?

II. Trends toward change.

1. De-centralization.

Richard de Gennaro, in a milestone article in the Library Journal last spring, identified those changes and trends and their causes.[2] Noting that "society is creating decentralized alternatives to almost every centralized form of organization"[3] he stated that "advances in computer and information technology increase the speed and force of the trend toward decentralization, and that trend, in turn, has a powerful impact on the way we use those technologies in...the field of library automation and networks."[4] Henriette Avram of the Library of Congress

has also recognized this trend, suggesting that after pulling the library community together "for 10-15 years - in order to use large machines with accompanying economics of scale - this new technology is now pushing toward decentralization."[5]

2. Computer hardware.

As Henriette Avram has identified, one of the major environmental changes has been in the computer industry. In 1975, for example, only the University of Toronto Library, the largest in Canada, operated its own computer. With the advent of powerful mini-computers, by 1978 - three short years - several libraries in Ontario had moved from use of their central University or City computer to control of their own mini-computer and automated systems. By 1983, micro-computers have brought similar local systems to schools, smaller college, university, or public libraries, and to industrial information centres.

3. Telecommunications.

The development of packet switching for data communication as well as the use of satellites for data transmission has had a major impact on library networks in Canada. Through the reduction in communication costs which they made possible they have encouraged the concept of independence at the same time as they have supported responsibility to a larger group, region, or to the country as a whole. It is now affordable for a local library to remain autonomous, but at the same time to contribute to resource sharing networks.

4. Online systems.

Many libraries began using online systems in the early 1970's, primarily with online retrieval of bibliographic citations from external commercially controlled data bases. (DIALOG, ORBIT, etc.) It wasn't until 1976/77 that online

technology was applied to internal library transaction or processing activities such as circulation, and the advent of the mini-computer was directly responsible for this change. (Many libraries found by sad experience that you can't operate an online circulation system based on a shared and externally controlled mainframe computer!) These original online systems were developed in local libraries - National Library of Medicine, Pikes Peak Colorado Regional (public) Library System, Northwestern, California or Guelph University libraries - and responded to requirements defined by the local environment.

5. Commercial vendors.

The entrance of commercial vendors into the online library system arena expanded the implementation of such systems into libraries which had had little or no previous involvement with library automation. In the United States CL Systems Ltd. marketed online circulation systems for individual small libraries or for clusters of similar libraries. In Canada, the Geac Canada Ltd. online circulation system, which included public access, was quickly adopted by many libraries and it expanded into the United States and Europe as well.

6. User interface.

The online systems, whether local or from a vendor, allowed library users to interface directly with the library data base for the first time, and with a better understanding of new technologies, users became more knowledgeable about what they could expect from automated online systems. More information, quicker response time, more friendly screens, capability for record downloading to their own systems, became common requests from faculty researchers and student users in school, university and

corporation libraries, and online systems adapted, or attempted to adapt, to those requests. User access, remote from the actual library became common.

7. Networks.

All the changes already identified have had major impact on library networks. The 1960 and 1970 networks, which encouraged the resource sharing or catalogue support services made possible by large centralized mainframe computers, are changing. It is now recognized that the 'network' cannot support the local systems - circulation, acquisitions, serials and document management, public access catalogue - either efficiently or effectively. Networks are seen, therefore, as a supplier of source records; a location mechanism for resource sharing; a supplier of software for local systems in some instances; a developer of communication protocol and standards in others.

Most of the North American networks have been based on bibliographic utilities such as OCLC, WLN and RLG. In Canada, UTLAS, which grew out of the library automation developments at the University of Toronto, fulfills that role although only British Columbia has had an actual regional network based on those services.

8. Financial considerations.

Almost as important as technology as an agent for change has been the financial environment in which libraries operate. In the late 60's and early 70's, cooperative and resource sharing networks were seen as a responsibility which libraries should accept. The realities of 1980 funding has forced libraries to re-evaluate that concept. The experience of the 1970's has taught us that cooperation can be a difficult, time consuming, and expensive way to do something, with the results

frequently disappointing.[6] Networks which can no longer deliver needed services at favourable prices are losing customers to stand-alone local systems supplied by commercial vendors. This trend of reduced financial circumstances leading to withdrawal from some if not all network activities is a reality which, like technological development, is not likely to go away.

III. Canadian/American differences.

It is at this point, having identified factors in the environment that have led to changes since 1975, that I must also point out that Canadian and American responses to those changes have been different. A description and explanation of those differences should be useful in the Australian context.

1. American networks.

In discussing American library networks it is impossible not to discuss OCLC, RLG and WLN, and the relationship of the Library of Congress to them.

- OCLC, Inc., is the largest bibliographic utility in the United States, with more than 3000 members and in excess of eight million records. The data base is organized in such a way that there are no relationships established among the records, so that authority files have to be implemented at the local level. Users must also be aware of lack of standardization or of duplication in the data base. It is recognized that one of the major benefits of OCLC is the use of its data base as a location tool in interlibrary lending. This use has resulted in reduction of the lending load on the larger research libraries, as the lending responsibilities have been dispersed to the many smaller libraries whose records now appear in the OCLC base.

- RLG, the Research Library Group, uses RLIN as its bibliographic utility and its principle objective is to serve research libraries. Its goal is to build online catalogues for individual libraries and to provide the linkage that results in a union catalogue for resource sharing purposes. Unlike OCLC it has subject access so it is a powerful reference/research tool.

- WLN is a regional not a national system. Like RLIN it provides capability for cataloguing according to local practices and, in addition, has an authority control system. The WLN software is transferable, as Australia knows, and a turnkey version of the system is being developed.

- Both RLIN and WLN have developed acquisitions modules for their members and are developing or adapting other systems such as circulation or serials check-in, for their members as well.

All three bibliographic utilities use Library of Congress MARC records as the primary source of their services. OCLC uses the Library of Congress name authority tapes as well. However, in spite of discussions between RLIN and WLN there is no sharing of resources among the three systems. The most serious problems facing networks in the United States today is this issue of ownership of the data.

Although, as Henriette Avram pointed out at an Association of Research Libraries (ARL) meeting in October, 1983, the Library of Congress has created most of the bibliographic data in the network data bases,[7] the bibliographic utility exists on revenue derived from the manipulation or transfer of that data and records. Since open sharing through a linked system such as Library of Congress, WLN and RLIN are exploring would limit control over its data base and hence its revenue, OCLC has asserted its ownership claim over all data in its base, and has applied for copyright for that data base.

This latter move, which has caused consternation in library circles in the United States, also has implications for international networks. The National Library of Canada, (NLC) for example, sends Canadian records, CAN/MARC, to the Library of Congress for distribution by the Library of Congress. These go on the MARC tapes which are distributed at minimal cost to the bibliographic utilities. The National Library of Canada cannot accept the concept that OCLC has copyright on records which originated in Canada, and that it has a right to withhold those records from Canadian libraries or to derive revenue from them.

In addition to the Library of Congress and the three major utilities there are some 22 regional service centres such as NELINET (New England Library and Information Network) which act as middlemen between the utility and the local library. The problems of data base control is forcing these centres to consider operation of an independent computer facility, in a concept not unlike the WLN network.

The local library systems which operate independently from any bibliographic utility, although there are fewer of them in the United States than in Canada, should also be recognized as having a role in the total U.S. bibliographic network. Such libraries have concentrated on local operating systems such as circulation, acquisitions, serial control, and public catalogue access, with an integrated, local, user oriented system as their primary goal rather than resource sharing through a utility network. These libraries are also moving toward small decentralized library networks, preserving maximum local autonomy and achieving economies through lack of the necessity of a centralized data base. Installation of similar systems (e.g. VTLS* or Geac) in states (Virginia) or regions, (Northeast New England) with telecommunication links between them can form an effective voluntary distributed network with minimal loss of autonomy and expense.[8]

*VTLS: Virginia Tech Library System.

What are the issues in addition to that of ownership of data which the U.S. networks face?

(a) Size.

The largest of the utilities, OCLC Inc. is in danger of becoming increasingly inflexible and unresponsive to the growing and changing needs of their multi-type library users. It tends to be undercapitalised and overgoverned, and has difficulty keeping up with commercial vendors who have new systems and services and the investment capital needed to develop and market them.[9]

(b) A central node.

Henriette Avram identifies a central facility as the single data resource as the key issue requiring attention in U.S. networks.[10] At the October ARL meeting she expanded on the need for that facility, the problems to be overcome in reaching it, and the measures being taken by the Library of Congress to achieve that goal:

A union catalogue, or a single data base for bibliographic records, cannot exist without the acceptance of agreed standards. But no matter how much libraries - or their cataloguers - agree to use Library of Congress standards - classification, subject headings, descriptive cataloguing, AACR2 and MARC - deviations are constantly and continually made. The full value of such a single bibliographic data base cannot be attained unless there is an organized structure to it, i.e. authority control, and this has proven impossible in the present American network configurations.

(As a diversion, it was this same problem which led to the collapse of the UNICAT/TELECAT bibliographic system in Ontario and Quebec. With no single library having authority to monitor record standards, the cost of adding authority control to the data base was prohibitive. Libraries returned to their local

systems, where, in an online environment, the structure of the computer file and system indexes can create its own authority control structure).

Mrs. Avram sees the possible solution in the present arrangement which allows the Library of Congress to accept cataloguing, online, from Harvard University and the University of Chicago, with Library of Congress staff monitoring or revising the records before they are added to the data base. Thus the records become Library of Congress records, subject the Library of Congress authority controls. Harvard and Chicago cataloguers are trained at the Library of Congress and have access to all Library of Congress tools, online, so that the Library of Congress is finding minimal problems in accepting what could be called 'foreign' data. Similar arrangements with other libraries could lead to that single central data base, with an inherent authority - name and subject - structure with updating capabilities and flexibility for other changes, and which could form the basis for the sharing of cataloguing records and resource locations.[11]

With such a facility in place the dependence on local systems for such activities as circulation, acquisitions, serials control, etc., becomes obvious.

This concept challenges the future role of the bibliographic utilities.

(c) Nationwide planning.

With the diversity of networks and/or utilities, and with the problem posed by ownership of data, it has not been possible to have nationwide planning for library networks. There is duplication of effort in retrospective conversion, and in serials cataloguing. (CONSER, which originated as a cooperative serials system in Canada, is available only through OCLC!). OCLC refuses to join in the linked system discussions with RLIN, WLN and

Library of Congress. The Library of Congress is not the National Library, in spite of its important leadership role, and has no mandate to coordinate or impose network concepts.

(d) Bibliographic maintenance.

At the pre- ARL meeting, mentioned earlier, David Bishop of the University of Georgia described bibliographic maintenance as the least understood cost factor in cataloguing today. While he advocated planning for local data base maintenance as important, he identified a program for national bibliographic maintenance as a major deficiency in existing network planning. The plan put forward by Henriette Avram would solve this problem as well.

3. Canadian network development.

Canadian network development has been quite different, in part caused by our unique geographic distribution in a 3,989 mile long strip along the U.S.A. border; in part by our history: we became a country 100 years after the U.S.A., and we are both bilingual and multi-cultural. Canadian library networks have tended, therefore, to develop provincially (Ontario, B.C. and Quebec) or regionally, (Prairies and Maritimes). The single bibliographic utility, UTLAS, is seen as a commercial vendor rather than as a network itself, as OCLC, WLN or RLIN are perceived in the U.S.A. While many libraries secure some or most of their records and processing from UTLAS or use its data base for ILL locations, others use the services of the National Library, which makes MARC records from CAN/MARC or LC MARC available on tape, distributes the entire tape at low cost, or acts as a limited network host through use of its DOBIS system for the federal government libraries in Ottawa. Blackwell North America and Carrollton Press (the latter for retrospective conversion) also are or have been used as record sources.

Distributed networks, which disperse the processing power and functions over the network, have been much more common in Canada. In Quebec the BADADUQ system links 10 campuses of the University of Quebec. In Ontario, Geac users have formed what could be called a distributed network. Independent local systems have also flourished.

It was in this rather diffused scene that the National Library took a leadership role in Canadian network development. As discussed above, early computer technology dictated a "closed national library network, with a central union catalogue file to which all other systems would be connected."[13] However, a new approach was made possible with the internationally accepted Open Systems Interconnection (OSI) model. Cynthia Durance, director of the NLC Network Development Office reported recently on the difference between the open network facilitated by the OSI model and the existing closed network configurations.

Closed networks are star networks, implying host-terminal relationships, centralized data bases, requirements for compatible equipment, and network or system specific commands and protocols. In contrast, an open network model configures the interconnection of different host computers and simplifies access to many different data bases. Since there need not be one central or master data base, the Canadian library network data base becomes the sum total of all data bases in the network.

Included in this model is a common command language for accessing the data bases within the network (including library processing, information retrieval, full text and publishing data bases). In addition, each system or closed network can be autonomous in its development as long as it can convert its internal configuration into the network standard when access

beyond the system or closed network is needed. The Canadian network will thus become an add-on to the local/regional system, to be accessed as required. The open network is really a network of closed networks.[14]

Given the diversity of Canadian system and network developments it is little wonder that Canadian libraries, under the leadership of the National Library, have embraced this model, and planning, including pilot projects, have been underway for the past year. I would like to briefly describe these developments and their successes.

The first step in this network development was for the National Library to establish a Task Group on Computer/ Communications Protocols for Bibliographic Data Interchange. This Group was composed of technical experts from libraries, computer, and telecommunication industries and its mandate was "to develop a set of protocol standards capable of ensuring cost-effective communication between library and information systems in accordance with the OSI philosophy."[15] The work of the American National Standards Institute (ANSI) and the International Organization for Standardization (ISO) was monitored and liaison was established with those and other organizations.

The second step was involvement in the iNET gateway trial mounted by the Computer Communications Group (CCG) of the Trans Canada Telephone System. Five libraries (CISTI and Carleton, Waterloo, Quebec at Montreal and Guelph Universities) joined with the National Library to form the Bibliographic Common Interest Group, (BCIG), which was associated with six other groups (for banking, travel, petroleum, etc.) in the trial.

Each participant in each common interest group has been able to access the Network Access Node via Datapac, (the Canadian packet switching carrier), with the Network Access Node providing an interface between data bases, including authentication

and automatic access, personal directory facilities, and network maintenance facilities. Once connected to a particular data base the exact search procedures of that data base must be followed.[16]

As a participant in this project Guelph was part of a very exciting experiment. Each senior staff member (department heads and assistant/associate librarians) plus the interlibrary loan/information desk office was equipped with a terminal (standard ASCII) and assigned passwords. In addition, alpha-geometric videotex (Telidon) terminals were located in each public service division, and several staff members were trained in the creation of videotex pages.

We tested six concepts:

(a) Electronic messaging - among Guelph staff and with other members of the BCIG.

(b) Electronic messaging as a mechanism for interlibrary loan.

(c) Access to each other's data bases.

(d) Transfer of records from one data base to another.

(e) Relationships with local public libraries.

(f) The feasibility of videotex (Telidon) systems for library orientation or information programs.

A wide difference in bibliographic processing systems and equipment existed in the six BCIG libraries:

- the National Library and CISTI used DOBIS;
- CISTI accessed UTLAS for some source records for its cataloguing;
- Carleton used a locally developed system on a Honeywell computer;

- Quebec at Montreal used BADADUQ (a decentralized network system which it had developed) operating on IBM equipment;
- Waterloo and Guelph both used Geac hardware, but their software and data bases were not completely compatible.

The results of the one year pilot project have been a resounding success.

(a) Electronic messaging has proved an extremely effective management tool, providing rapid information distribution and an inexpensive communication mechanism. The number of meetings on which we previously depended to coordinate objectives and services have been reduced as we respond to problems more quickly. The ability to communicate so directly with other libraries has also reduced the necessity for meetings, the cost of letters, Telex messages and courier systems, and has created a feeling of community not previously achieved.

(b) Carefully monitored statistics reveal that electronic messaging for interlibrary lending reduces costs by at least 50 per cent and subtracts 2-3 days from the delivery process.

(c) Access to each other's data bases provided quick and exact location information for interlibrary lending as well as cataloguing copy. Decisions not to order certain items were made on the basis of knowledge of another library's holdings.

(d) Record transfer was the most difficult test to design and has just been completed. For example, it is now possible to transfer MARC records from the National Library DOBIS system on an IBM mainframe directly into the Guelph Geac mini-computer. The conversion mechanism and protocol, developed by the Task Group mentioned above, is in the iNET interface system. This will allow Guelph to stop mounting MARC tapes in-house in the future, thus saving considerable disk storage costs.

(e) The Guelph Public Library became a subset of the test, using electronic messaging, Telidon as a community information service, and accessing all the data bases. Their enthusiasm, particularly for improved interlibrary loan routines and their sense of community, is unbounded.

(f) Several Guelph librarians developed facility in Telidon page creation and have created an exciting orientation package. Students have been extremely interested and receptive to this new self instructing system.

This has been, of necessity, a brief and informal report of the first tentative steps in the development of an open system network. Although successful there is still more to be done. It has been recognized that there is a maximum number of data bases that a user will want to cope with - i.e. it was annoying, after a while, to first check Carleton, then Waterloo, Guelph or Quebec for one title. This can be solved by redesigning the various access layers so that the transfer from one data base to another is transparent. It has also been recognized that all bibliographic systems intending to operate in an open networking environment should begin to implement standard interfaces to public data networks.

3. Summary of the differences.

In summary, then, the American network approach is toward one centralized bibliographic data base. The need for common standards, authority files, and linking is recognized but no single overall plan has been perceived as the direction to pursue. The cost will be enormous, even if political problems are solved. In contrast, Canada is depending on communications technology to allow interconnection of diverse systems in an intelligent nationwide information network.

IV. Network implications for Australia.

It would be very presumptious for me to come from Canada and to suggest, on the basis of very limited knowledge, a direction for Australia to follow. However, both the American and Canadian network experiences do provide some directions which may be useful.

1. Local systems.

In the American model network, at least the ideal one, there would be one centralized bibliographic data base with one set of name, series and subject authorities. A book would be catalogued only once and all libraries would have access to that record. With each local library maintaining its own subset of the correct catalogue records and authority files there would be no problem in the creation of regional or national union lists for different formats or subjects, or for accessing different library data bases. Local libraries would also maintain their own systems for circulation, acquisitions, serials, online catalogue, etc., based on the records received from the central bibliographic data base, but authority or bibliographic control would have been established at the central data base.

This concept does not accommodate the fact that most libraries have already established data bases without absolute adherence to either MARC format or cataloguing standards. Moreover, many libraries have already integrated, or wish to integrate, variant material such as documents, maps, films or archives into their access systems, and do not want to deny access for their users just because the national network has not provided for those materials in a compatible system. This centralized nationwide bibliographic control system will not accommodate all local needs.

In Canada, the local system is recognized as the most important one in terms of service to the user at an affordable price, and the incompatibility of records, of hardware, of software is accepted. Telecommunication technology is being used to create a bibliographic information network out of this diversity, at far less cost than the American model.

2. There can still be a place for a regional network in either the American or Canadian model, since geographic proximity or a common jurisdiction provide ample encouragement. Again, the Canadian model can be a simpler and less costly method for achieving a regional network.

3. The future role of bibliographic utilities, not as strong in Canada as in the United states, is less certain. Librarians, at least in the United States, will use utilities for shared cataloguing and location information, but only so long as the utilities can provide these services effectively and at a reasonable price.[17] It may prove economical, for example, to distribute the MARC data base using optical disk technology, and the need for utilities would largely disappear.

4. For a country like Canada - and Australia shares many of our geographic and historical factors - the concept of a distributed network, a network of networks, has appeared as the only viable model. Telecommunication technology, which Australia also shares, (with AUSTPAC and the future AUSSAT), and with a National Library to provide leadership in planning and coordination makes the Canadian network model a very attractive one.

V. Information management in the network environment.

Accepting a network environment, what is the role of the local library? Richard de Gennaro suggests that library managers cannot afford to be totally dependent on external and sometimes fragile systems over which they have little or no control, and which cannot be fully sensitive and responsive to local political and financial concerns and pressures.[18] It is also suggested that each library manager should be cognizant of new technologies and question existing standards or control systems in light of the changes which those technologies make possible.

A more independent library manager, responsive to the needs of his own user, taking data from bibliographic networks as appropriate, encouraging access to his own data base from remote locations for his own clientele or for members of other jurisdictions or communities as needed, can therefore be identified. Such a manager sets the standards for his own information system, within the context of national bibliographic and collection resources and his responsibility to them. Although that responsibility should not be underestimated, new technologies have provided the mechanisms which allow the local library to define its own bibliographic control and access systems in both efficient and effective manner. As libraries install their own local online catalogues and convert their retrospective records into that data base, priority will of necessity be given to the development of the local system, and prior thinking on library networks will have to be re-assessed in the light of emerging technology.

One of the great challenges now facing the library profession is the determination of the relationship between the local library system and the network. I would suggest that although a variety of models will be available on which Australian direction can be based, the Canadian experience, for both local systems and for regional and national networks, is one well worth considering.

References

1. Beckman, Margaret. Cooperative approach to library automation in the academic libraries of Ontario. In:

2. De Gennaro, Richard. Library automation and networking perspectives on three decades. In: Library journal, April 1, 1983. p.629-635.

3. Ibid. p.629. The author is quoting John Naisbitt, whose ideas are presented in detail in Megatrends: ten new directions transforming our lives. New York, Warsaw, 1982.

4. Ibid. p.629.

5. Avram, Henriette. Directions in library networking. In: JASIS, November 1980, p.441.

6. De Gennaro. Library automation. op.cit. p.632.

7. Avram, Henriette. The major problems. Unpublished paper delivered at the ARL meeting, October 20, 1983.

8. De Gennaro. Library automation. op.cit. p.635.

9. Ibid. p.633.

10. Avram, Henriette. Network level decisions: basic and key issues. In: Information technology: cirtical choices for library decision-makers, edited by Allan Kent and Thomas J. Galvin. New York, Marcel Dekker, 1982. p.163.

11. Avram. The major problems. op.cit.

12. Bishop, David. A blueprint for action. Unpublished paper delivered at the ARL meeting, October 20, 1983.

13. Durance, Cynthia. Initiatives toward a bibliographic communications network for Canada. Ottawa, National Library of Canada, 1981. p.3.

14. Ibid. p.4.

15. Task Group on Computer/Communication Protocols for Bibliographic Data Interchange. Interim report. Ottawa, National Library of Canada. p.7.

16. Durance. Initiatives. op.cit. p.6.

17. De Gennaro. Library automation. op.cit. p.634.

18. Ibid.

19. Beckman, Margaret. Online catalogs and library users. In: Library journal, November 1, 1982. p.2043-7.

ELECTRONIC PUBLISHING AND TECHNICAL COMMUNICATIONS:A USERS VIEW.

MARCUS R. WIGAN

Chief Scientist (Transport)
Australian Road Research Board
500 Burwood Highway, Vermont,
Victoria 3149.

Phone: 03-233-1211

Direct electronic addresses:

SOURCE: ST3160
PARTICIPATE: TRES
TELEMAIL: MWigan
TELECTR: WIGAN

Abstract: The changes in information technology are having a considerable impact on the manner in which professional gather, use and disseminate information. The electronic media are providing an increasing range of electronic publishing for and through data and communications networks, leading to a fundamental change in the nature of the librarian's task as video, audio, text and data resources become the province of the librarian to acquire and retain. Problems raised by the rise in electronic publishing and information networks include rising productivity expectations on professionals, who are in turn failing to pick up and exploit the available tools, partly due to a lack of knowledge and partly due to the undercapitalisation of professional as against industrial workers. This paper examines major aspects of electronic publishing as a developing process of change rather than concentrating on the technical details of the media and the methods.

KEYWORDS:
/PUBLISHING/TYPESETTING/MICROCOMPUTERS/COMMUNICATION(NETWORKS)/EXPERT SYSTEMS/ WORD PROCESSING/ PACKET SWITCHED NETWORKS/ PRODUCTIVITY/ DIFFUSION OF INNOVATION/

INTRODUCTION

The task of the scientific worker has changed as productivity aids have multiplied. The aids that have come to the resuce of the librarian have come to beseige the worker at the sharp end of the problem, as the manpower resources per technical worker continue to plummet, the levels of support for other areas (often termed "service" functions), come under increasingly severe greater scrutiny.

It is no longer uncommon to find a senior professional workers typing most of their reports themselves, carrying out their own data base searches, and personally carrying their work through to an advanced stage of the process of typesetting and graphics production, and even 'publishing' their work over or through one of the many electronic networks now available.

This is perceived as threat by many in these traditional areas, and yet so many knowledge workers with these facilities to hand still do not take even a slim advantage of them. In part this is due to a lack of knowledge, and in part to the very low level of capitalisation in support of professional workers , when compared to industrial workers. This has led to a rising expectation of what can be acheived by professionals, based unconsciously on the higher levels of productivity being obtained from capitalisation and re-equipment in production areas, thereby leading to greater pressures on professionals who are -in the main - not getting the investment in office and information productivity enhancement tools directed to their needs.

To make sense of these contradictory trends it is useful to consider the scientific process itself as an example, to see how information and publication demands are generated and serviced, and also how the rewards (in professional terms) articulated and propagated.

The development of this theme will pursue a route through the definition of the term, the learning process itself, the electronic aids and the specific initiatives in large scale electronic publishing, to close with the altered roles for librarians as archivists and information providers.

THE COMPONENT ELEMENTS OF ELECTRONIC PUBLISHING

The term 'publishing' has an overtone of 'printing', i.e. output from the information process. This is one of the many misleading ideas that are still being carried over by those involved in books and written materials -where this is a correct and appropriate attitude, as books have long been the most economic and effective means of spreading knowledge more widely than could then be done by an individual by direct contact.

This latter point is the reason that recent developments in networked communications are causing so much change: the authors of documentary and other types of works are now once again

potentially able to reach most of their 'customers' without an intermediary.

Figure 1 summarises the different areas in which the term electronic publishing may be applied or become relevant. These vary from the input media used to produce conventionally published materials through the production process itself, to the distribution of the 'published' materials in an appropriate form.

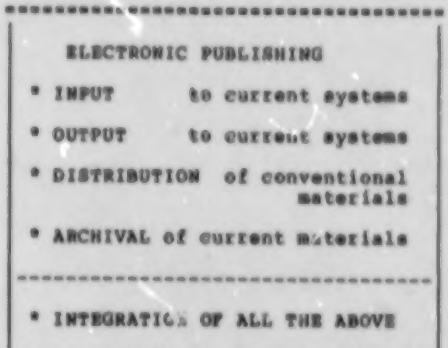

ELECTRONIC PUBLISHING
* INPUT to current systems
* OUTPUT to current systems
* DISTRIBUTION of conventional materials
* ARCHIVAL of current materials
* INTEGRATION OF ALL THE ABOVE

Fig. 1 Definition areas

The input of materials by elctronic means is now well established, and microcomputers are an unusual sight only in the most conservative organisations, or those large ones who have as yet been unable to develop a fast, balanced and integrated approach to such personal processing machines.

The use of Optical character readers (OCR) is still small, although multifont optical readers (such as the KDEM Kurzweil) have been available in Australia for some time. In the UK the academic community has made increacingly effective use of such devices, perhaps one of the best examples being the reader installed at Oxford University which services the various universities in the southern area of the UK. The Oxford KDEM is used extensively to capture vast amounts of text from ancient and other sources, and is run in harness with the Oxford Concordance Program to make effective use of the text in its newly machine-readable format.

Input of this type is an effective machine-readable REpublishing process, and substantially raises the power and utility of the book- and print- bound text.

Output on magnetic media is not yet as common as output to COM

devices, which provide a halfway house along the road to fully electronic publishing.

The production of 'final copy' on an electronic medium is the most readily understood form of electronic publishing. This final copy may be in the form of data, of fully formatted text, or of encoded information (such as maps or other digital records).

The most common form of electronic publishing to date has been the direct use of such magnetic files to drive typesetting equipment to produce the final paper copies of the printing masters. This is not quite 'electronic publishing', but this part of the process of automation in the printing field has been regarded as 'electronic publishing' by many who have not yet realised the pervasiveness of the overall impacts of the steady move to magnetic media.

This confusion has been fed by the increasing complexity of the typesetting process handled directly by the authors, who may now, through the medium of the TEX typesetting program and the associated program for type style design (METAFONT) (Knuth, 1982) design their own fonts and typefaces, and lay out their own material to the page proof stage including figures and diagrams.

Such systems serve mainly to show how far the control of the final product has moved back to the author, a message which is repeated for the publishing and the distribution stages of the electronically-aided version of the classic publishing process.

The distribution of printed materials, once published, follows a fairly clear cut route. The confusing issues arise only when the informal (and swiftly changing) literature is taken into account. The problem with attempting to ignore this 'informal' material is that the rate of change in most of the non-traditional areas of knowledge has become so swift that the delays imposed by the printed publishing process are becoming a severe handicap to those not in close and continuous contact with the centres of innovation in the specific fields concerned.

The use of on-demand printing via laser printers has already started to take a firm hold, not only for the notable economies in direct costs for small print runs, but because of the drastic drop in the turnaround time to produce printed materials of some size in a usable form. On-demand printing confidently be predicted to follow the wider availability of laser printers and access to the software to drive them, with a very rapid growth. before the end of 1984 such laser printers will be available at prices well under $10,000 (perhaps even under $5,000 if APPLE Computers keep to their timetable), driven by microcomputers.

These trends will exacerbate the problems of libraries in keeping up to date with the materials and form in which published material is made available, as the basic magnetic files to drive on-demand printers will become swiftly disseminated in the magnetic rather than the printed format, at least until laser

printers are widely and economically accessible.

The archival aspects of librarianship will also be affected by the problems of handling, retrieving, and distributing more and more different forms of archival materials. The audio-visual records now being tackled for effective acquisition will now be followed by archived video and digitised meassage formats, on equally expensive media, and the increasing demand from both the professional and the non professional public to make programs and computer applications available in a similar format. The basic data generated in such large volumes will also become a commodity in greater demand as personal computer power becomes more and more taken for granted, and as people demand the productive output possible from their computers rather than simply the games which are now most commonly on offer.

The integration of all of these aspects of electronic publishing is quickly arriving through the media of packet-switched public networks and the arrival of optical discs as archival and consumer storage media.

PHYSICAL PUBLISHING INTERACTIONS
* Typesetting, wordprocessing and microsystems.
* The role of digital capture of images
* Micropublishing
* Layering of the market by reaction time.

Fig. 2 Physical interactions

The physical devices involved in these changes are briefly summarised in Fig. 2. The ready availability of microcomputers, word processing and typesetting equipment is changing the balance from the manual entry of text to the direct entry of text onto screens or to magnetic media of various types. The modem has picked up a certain amount of the task of the voice band width of the telephone, and as the integrated data service networks (ISDN) come into service will pick up yet more.

The direct capture of images is an area of electronic publishing which has been escaping the notice of many people. However, the publishing of LANDSAT and other earth resources pictures on mangetic tapes and floppy discs has been going on for some years, and is growing in popularity.

Recent developments in high resolution camera based on charge coupled device (CCD) technology have already entered the office. Direct images of the incoming texts are now being taken as material arrives, and such local office networks as Wang now offer piped image data from screen to screen around an office. This is not yet easily integrated into fully electronic publishing, as the meaning of the text so captured is not sought, and so must be reviewed visually by the intended reader to determine the information content of the document.

This is an electronic version of micropublishing, where the printed text is turned into a high information density medium which can be cheaply and quickly copied as an entity. The video image captured on an electronic medium is in the same category, and can be stored on an optical disc at very high information densities indeed.

The impacts of these expanded ranges of options for publishing can best be understood by using the concept of a market for information which is layered by the reaction time of the period between information acquisition from the author to the reception by the user.

Concentration of limited librarian resources for the physical borrowing of written materials by means of prior searches through electronically held mass text data bases is one of the developments of the last decade. The written text is still the only form in which much of the material can be obtained, but the identification of the source, context and location of these materials are substantially speeded by the use of networked abstracting systems.

For really rapid publishing and user response times, the authors in some fields (such as artificial intelligence) rely on the invisible college to a major degree - and have augmented this college to all those who can access on or two of the world wide communication networks such as ARPANet or UseNET for Unix users. AustPac is now opening the way for a far wider community to use such services effectively and economically.

THE PROCESS TO BE SERVED BY ELECTRONIC PUBLISHING

The essential features for the librarian and the end user of the developing field of electronic publishing are common to the two groups. The learning process itself is subject to an overall pattern, and the areas of added productivity are readily identified from a diagram such as Fig. 3.

This figure illustrates a general model of the search and learning process which can help to organise ideas about information systems and the productivity gains which they can help to bring about.

The lower axis represents time, and the vertical axis the accretion of effective knowledge. When starting on a new problem, there may be little personal experience to draw from: the process of casting around to gather enough information and materials to be able to learn effectively is time consuming and slow to get going.

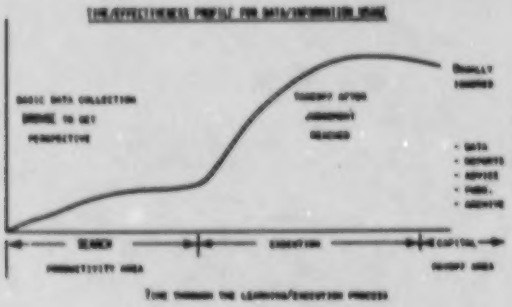


Fig. 3 The growth in investigation effectiveness over time

The low rate of progress shown in the figure illustrates this. After a reasonable period is becomes possible to make judgements on new information coming forward, in terms of the new problem area itself. This first glimmering of selective judgement in this new area is the signal for rapid and effective cumulative advances to follow.

The tailing off after the 'end' of the investigation indicates the tendency to have insufficient resources available to make the full results of the work more widely available, and the scanty reporting and shortfalls in archival material and documentation is all too familiar to those involved in attempting to gain access to data sources created in such a manner (Wigan, 1984a).

In each area there is a major role for electronic publishing and librarian support. Perhaps the most productive area of all is in the initial 'browse' phase of the process, where the substantial fraction of the available time is necessarily often spent. Here remote text abstracts data bases have a major role to play in telescoping the time required to reach an informed request list for primary materials to be obtained and studied.

These text abstract data bases are of crucial importance in saving the lead time otherwise expended in awaiting the arrival of the initially requested reports in physical form. Consequently text abstract data bases are a very important form of electronic publishing, with a major potential for enhancing the productivity

of research and investigation workers. The effects of reducing this initial turnaround time is to move the 'productive' phase of the time/effectivess curve backwards along the time axis, and increase the area ("effective work") under the curve by a large fraction for even small reductions in the time taken to get to the 'internal judgement' stage.

Further reductions in this startup time can be obtained by accessing the source materials through electronic means. This is the 'electronic publishing' of the media, where the primary materials and texts are held on line for remote access. This is not yet a very effective method of access to information, even by packet switched networks, as the quantity of information involved is large and the cost structure of such common carrier data communications as AustPac is at present based on the actual number of characters transmitted.

At this stage in the process the use of non-paper publishing (preferably onto a denser medium than paper) becomes crucial. The place of micropublishing is here. The mass transfer of textual information is extremely fast and very cheap when done via microfiche. The communications bandwidth required to achieve a similar quality and quantity of information transfer is at present far more expensive.

The direct production of microfiche from computer-held information sources (COM) has for many years been the standard means of reproducing and distributing mass data in a compact and manpower-efficient manner. The video tape has taken up some partof this role, particularly for 'management communications', but the sheer quantity of data embodied in the daily microfiche for bank records can as yet only be matched by the optical computer storage discs which are yet to reach the market in any quantity.

The last stage of the information generation and distribution process if the archival phase. This is often neglected, and storage of working and production materials in an electronic form (including machine-readable master copies of report and data text files) is a major role of electronic publishing - and perhaps the most systematically neglected of all.

The greater use of electronic publishing methods throughout the process will clearly improve not only the productivity of research and investigation workers but also enhance the quality and quantity of the work in addition to improved access to their data and detailed findings.

One of the key aspects to this line of development is the concept of data archives and access to them. It is now becoming more economic for the more sophisticated data archives to request the details of processing required by a potential user, and supply the data in the analysed form rather than produce a copy of a bulk detailed database. It is certainly considerably easier and cheaper to supply the documentation in machine readable rather

than a printed format.

The changing balances between printed and on line documentation, and user verses supplier carrying the cost of analyses are being pushed by the growing recognition that large data bases (other than text) are a common resource, and the added value comes from intelligent and selective access to them. The potential influence of these development on integrated regional planning has been considered elsewhere (Wigan, 1984b).

MODES OF OPERATION AS INFLUENCED BY ELECTRONIC PUBLISHING TRENDS

Technical changes in information services also have a substantial effect on the manner in which users respond to the new possibilities for service that the new technology creates.

Most of the major pressures for changes to electronic forms of publishing have been from the cost reduction side, and a short list of the primary influences might be given as follows:

1. Cost reductions in production
2. Cost reductions in distribution
3. Pressure for higher densities of data storage
4. Pressure for access to machine readable materials

The availability of electronic publishing aids is also altering the balance of the mode of operation of information seekers from a passive to a more active - and interactive - style.

ACTIVE v PASSIVE DATA SEEKING

- Abstracts, books, journals are PASSIVE data sources
- Data base searches, Research in progress checks are ACTIVE
- Active inter-user links are growing with electronic mail
- Lags in Archiving/retrieval push users to link up for 'Electronic mail' publishing or contact searching

Fig. 4 Modes of information seeking.

The changes in the media for information storage and seeking are also having a distinct influence. Just as public libraries slowly responded to the demand from the public for loan acces to records and cassette tapes of music and drama, access to data and to data retrieval and information services will begin to be the subjects of wider user pressures for provision as a public good - and certainly as a professional service.

The classic model of information seeking is through books and journals, with contacts between scholars playing an important part when such contact can be sustained and justified. The search for appropriate books and articles is a 'passive' mode of information search, as distinct from the active journey to study under a known scholar that characterised the middle ages.

The present capability to search remote data bases in place of visits to distant libraries has given the power to information users to narrow down their area of interest and reach sensible questions which are not fully satisfied by the immediately accessible literature, and in a considerably shorter time than before.

The next stage of the pursuit is also being eased by electronic means, as the electronic mail networks permit closely targeted contacts to be made directly to individuals in tightly defined areas.

The best known of these networks are probably ARPANet and USENet. ARPANet was set up by the US Department of Defense for packet switched network developments in the last decade, while USENet is a world wide link between users of the UNIX operating system, so prodominant in academic and related institutions.

These networks have become to a considerable extent the electronic publishing medium of at least some of these groups, in particular of the community of workers in artificial intelligence, logic programming and related fields.

The work of these groups is peculiarly hard to obtain in the open literature, in part due to the speed with which the subjects are developing and in part due to the significant use of the electronic networks as a contact/publishing/comment exchange medium.

The direct assessment of purely electronic journals (on line publishing rather than purely 'electronic' in production methods or distribution) has become a matter for concern by the British Lending Library in the UK, and extensive trials have been carried out at the University of Loughborough (Schakel, 1982). These trials have included all stages of the publishing process, from submission to refereeing and revision on line.

These were not the first such trials, and the EIES computer conference system (Kerr, Turoff, Johnson-Lens, 1982), which has

been running since the late 1970's with sociometric skills strongly represented on the team, has looked at the 'publishing' aspects of electronic mail and conferencing as part of a program on computer aided communications (Hiltz and Turoff, 1978). The EIES system has been used to test fee-paying 'electronic markets'.

This idea which has been taken up by the SOURCE Telecomputing Company of Mclean, Virginia, which offers 40,000+ subscribers world wide services for communications, data base access, and teleconferencing through the Participate Systems Inc. PARTI computer aided computer conferencing system. There are services on PARTI alone where the read/write access fee exceeds $1000 a month, and provide two-way interaction with the MIT experts providing the conference with the up to date materials.

The SOURCE also offers an integrated range of third party services through its common charging system, and the gateways into other computer networks. the economics of making small charges for access or use of individual data items is made much more practical by this conjunction of umbrella account and automatic computer accounting.

Special services such as 'ELectures' (simply electronic lectures by prominent people accessible at a reading fee: the first of these was given by Roxanne Hiltz, of the EIES project, which has substantial experience in the use of computer aided communications in education (see for example, NJIT, 1982)).

There are a number of advanced educational programs available across the USA on the SOURCE and on EIES, and the full course materials are electronically published on line.

AIDS TO ELECTRONIC PUBLISHING AND ACCESS

The tools for using and exploiting each aspect of electronic publishing, as it becomes economic, are widely available. A brief list is given in Fig. 5.

To the brief list given in Fig. 5 must be added packet switched networks, telephone lines, television sets and the whole range of wide and narrow band communications services.

The convergence between microcomputers, word processing, typesetting, graphics, voice and image handling, and natural language recognition, voice synthesis and recognition, data base and 'expert' systems is now a clearly established trend.

One of the consequences of even the present state of dissemination of this material is that the knowledge based worker is now in a position to expect - not to say need - several tens of megabytes of data around him, and within reach, even when he/she is travelling far from home.

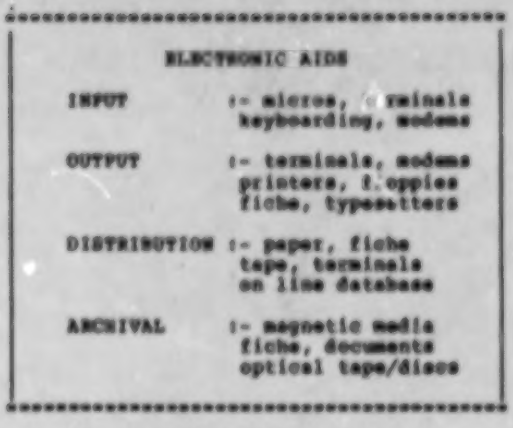

ELECTRONIC AIDS
INPUT :- micros, terminals keyboarding, modems
OUTPUT :- terminals, modems printers, floppies fiche, typesetters
DISTRIBUTION :- paper, fiche tape, terminals on line database
ARCHIVAL :- magnetic media fiche, documents optical tape/disco

Fig. 5 Electronic aids

There are already quite a number of small battery powered computers capable of being slipped into a briefcase at the same time as a battery powered modem and all the rest of the normal contents of a professional's travelling case. One such machine was shown at the VALA presentation of this paper (an Epson HX20 with a Transam Communications chip and a Livermore Star CCITT V24 modem).

It is important to note that a shirt pocket microfiche reader and a packet of 50-60 microfiche were also in that same case, as the communications limitations of a 300 baud acoustic coupler make the mass access to a portable library via on line services a little impractical still at this date.

This may yet change, as the intelligence of programs on small continues to rise, with small scale 'expert systems' (better termed 'knowledge based systems' for these homely applications, and to avoid comparison with the major pioneering efforts which cost tens of man years to produce).

As this intelligence rises the need to 'browse' through mass data banks will be proportionately reduced, and the searches on complex data bases will be simplified. The developments in logic programming now making a major impact on efforts in knowledge engineering are at the same time enhancing our abilities to handle natural language interfaces with users and intelligent relational data retrieval (Lloyd, 1981).

LARGE SCALE RESPONSES TO ELECTRONIC PUBLISHING NEEDS

Electronic publishing has also been seen as a major factor which could ease the distribution of the massive document movement needs of the European Economic Community, and similar very large and multicentred administrative entities.

The EEC and European publishers initiated two large investigations of various means of document delivery: ADONIS and ARTEMIS (Norman, 1981) being the acronyms of these two initiatives. The EEC initiated the ARTEMIS project in 1979, and the results were published in 1981/2 by Learned Information Systems in the UK (Norman, 1981: Gurnsey, 1982), together with a special supplement to an issue of Electronic Publishing Review as a major request for project proposals. The Community has very recently approved ten such experimental projects in the field of electronic publishing and delivery following a further call for such proposals under the DOCDEL descriptor in late 1982.

As part of the build up to these recent projects, a major reviews of electronic document delivery trends in the United States and Europe were undertaken : these were the series initiated in 1979 (Gurnsey, 1982) and a separate EEC and UK Publishers Association exercise undertaken by Pira (the UK Paper Industry Research Council, who host the International Electronic Publishing Research Centre, IEPRC, which published the report) .

A key concept was the digitisation of the pages of printed material, if they were not already in a machine readable format, to ease transmission and control. It is sobering to note that the feasibility of digitised document transmission was in question when these projects were initiated, but by late 1983 Wang Computer were offerring an integrated office product based on the direct digitisation and local retransmission of incoming text in digital form.

At a more mundane level, the EEC publishes all of its' newly released tenders on line, as well (to date at least) in the Official Journal of the EEC.

At the other pole of the publishing scale, the recent commitments to two large scale information technology developments in the UK and in the EEC as a whole have both placed a substantial emphasis on making available an electronic communications and publishing network to improve the effectiveness , quality and speed of communications between the information technology research and development communities involved in the UK (the JANET network under the Alvey (1982) program) and the EEC (a similar network proposed as part of the joint ESPRIT technology program).

These larger scale initiatives should not be permitted to obscure the grass roots developments in electronic mail and small scale publishing that preceded the larger efforts. Microcomputer enthusiasts have been operating large numbers of Bulletin Board

and message switching systems for quite some years, and the Microcomputer Club of Melbourne (MICOM) has been operating such systems since about 1981 - and are about to move to a multiuser system with multiple modems operating simultaneously.

This grassroots computer communications movement has been well documented for the US developments by Glossbrenner (1983), and the growing use of such systems for small scale electronic publishing of newsletters and the like has been overtaken by the active pursuit of modem and floppy disc submission of editorial materials by magazines and other bodies in the conventional publishing field.

SOME OF THE DEVELOPMENTS TO WATCH

The availablity of 'published' material in machine readable and widely accessible form raises fresh problems for librarians, and indeed for the professionals involved in publications.

The active practice of remote data base users of downloading the results of their searches onto their own local microsystem for subsequent re-use has swiftly led to changes in the charging policies of the data base suppliers. The ability to capture, adjust and re-enter materials in an electronic publishing environment is one of the penalties of an on-line mode of publication. The other side of the coin is the ability to take several sides at once in an electronically-assisted conference debate, by using pseudonyms.

This to date has been regarded as an asset by those using such systems for distributed discussion and decision support: if, however, others start to use YOUR pseudonym to sign messages, and if suitably adjusted versions of YOUR electronically published contributions start to appear with attributed to others (or, even worse, your own name on an 'adjusted' text), then the basic assumptions of the stability of 'publication' come under question.

What is the librarian, the author - or the publisher - going to be able to do about it?

The same issues also arise when archiving of data becomes more widespread: as also the confidentiality issue, which is one already recognised by most professionals.

Perhaps the most important issue for librarians to consider is the role that they should play in an information environment where data, text, vison, decision support and data base retrieval merge, and they , electronic publishing/printing , communications and computer centres are all competing for the central advisory role.

REFERENCES

ALVEY (1982). Advanced information technology. HMSO, UK. (78pp).

GLOSSBRENNER, A. (1983). The complete handbook of personal computer communications. St Martins Press, New York, USA. (325pp).

GURNSEY, J. (1982). Electronic document delivery III: Electronic publishing trends in the United States and Europe. Learned Information Systems, Oxford, UK. (94pp).

LLOYD, J.W. (1981). An introduction to deductive data base systems. Technical report 81/3 (Rev. 1982). Department of Computing Science, Melbourne University, Victoria. (22pp).

NJIT (1982). Telecommunications and higher education. Conference briefs. New Jersey Institute of Technology and New Jersey Department of Higher Education, Newark, NJ. USA. (101pp).

NORMAN, A.R.D. (1981). Electronic document delivery I: The ARTEMIS concept for document digitisation and teletransmission. Learned Information Systems, Oxford, UK. (98pp).

KERR, E., TUROFF, M., JOHNSON-LENZ, P.T. (1982). User manual for the Electronic Information Exchange System. Computerised Conference and Communications Center, New Jersey Institute of technology, 323 High St, Newark, N.J., U.S.A. (80pp).

KNUTH, D.E. (1982) TEX AND METAFONT. Digital Press, USA. (224pp).

SCHAKEL, B. (1982). The BLEND system programme for the study of some 'electronic journals'. Ergonomics 25(4) 269-284.

WIGAN, M.R. (1984a). The secondary use of transport survey data. IN: AMPT, E., BROG, W., and RICHARDSON, A.J. (1984). New survey techniques in transport. Croom Helm, London, UK. (In Press). [Internal Report AIR 380-9. Australian Road Research Board, Vermont, Victoria. (27pp).]

---------- (1984b). Information technology and integrated regional development. IN: NIJKAMP, P. (Ed.). Information systems for integrated regional development. North-Holland, Amsterdam, Netherlands. pp 271-83 (In Press). [Internal Report AIR 1110-6. Australian Road Research Board, Vermont, Victoria. (18pp).]

One of the penalties of going on one of these lovely overseas tours is that you have an obligation to pass on what you have learned to your colleagues. I counted up the other day and in a little over a year since I came back I have spoken fourteen times at seminars or conferences - many times on this particular subject. This is the fifteenth, and I hope the last.

This may be a relief to those who find themselves listening to the same thing on several occasions, but it's to be expected for another reason too: we've all been waiting for the on-line catalogue to arrive and, now that it has, it is spreading like wildfire and new prophets are arising all over the place. This is just as well because while the on-line catalogue is proving workable, affordable, and popular right now, it is still very much in the embryonic stage with plenty of room for development both in the concept itself and in the new areas to which it will certainly be a catalyst. Ingenuity is called for, inventiveness, vision, insight into the needs of the user unhindered by preconceptions based on present modes of service. There is enough to keep us occupied for some time to come.

While we are in an inspirational vein let me quote to you the words of Charles Hildreth in his recent book On-line Public Access Catalogues: the user interface:

> "Whether one is viewing the catalogue along either the storage dimension or the function dimension, the card and COM catalogues have more in common with each other than either has with the on-line catalogue. As a diverse and powerful functional instrument capable of providing the 'utmost in bibliographic access and service', comparing an on-line catalogue to a manual or mechanised catalogue is akin to comparing a bicycle, albeit motorised, to a manned space vehicle. Both facilitate the transporting of humans from place to place, but there the similarity ends."

Perhaps I've got further into this than I should have before defining what an on-line public access catalogue is. For this audience I'm sure it doesn't need defining but I'll do it anyway. OPAC is a pretty awful bit of jargon and I'm sure someone will think of something better soon - I'll simply use the term 'the on-line catalogue' for the rest of this session.

The on-line catalogue is a means by which a library offers to its public via computer terminals access to and display of information about the library's collection (in other words you put up the catalogue on a terminal). Let me emphasize that what we have here is a reader services toy - the cataloguers can have their fun with ABN - this is a means of displaying cataloguing data to the public wherever that data was originally created. To put it in context let me illustrate a typical example of a local library system. (Table 1)

We now have the means to store all our organizing data (and that's what libraries are all about - the organizing of information) in such a way that it is easy to integrate the various elements of it, and quick to manipulate it, to amend it, to add to it. But now we have a further challenge: how do we arrange access to it in such a way that the casual user can walk straight up to a computer terminal and use this instead of the card drawer or microfiche viewer as his form of catalogue. This is the design challenge of the on-line catalogue.

Today I want to divide this talk up into three sections. Firstly I want to summarize what I found in North America last year, then I'd like to cover the state of play in Australia at present, and finally the obligatory 'where are we heading' section - though in the on-line catalogue context this is a particularly obligatory section.

Firstly I'll put up a list of the places that I visited through April to June last year. (Table 2) If anyone has any particular questions about any of these sites I'll be pleased to try to answer them at the end of the session. The primary aim of the tour was to cover the main existing on-line catalogue systems, to talk to the people involved, to try out the systems from the point of view of the public user, and to observe the public in the use of these catalogues. I also tried to get to talk to a number of leading librarians who would be likely to have their fingers on the pulse of developments, e.g. Joe Matthews and Charles Hildreth who have since produced books on the subject, Jim Kennedy of AMIGOS and Ward Shaw of CARL, Michael Malinconico of New York Public Library who co-authored the book The Future of the Catalogue, and Don Swanson of the University of Chicago Library School. I'd like to group the on-line catalogues into the categories of in-house development, consortium development, and the package systems, and also cover a couple that don't easily fit into any of these three categories.

In the category of in-house development I saw systems at Ohio State University, Northwestern, Pikes Peak Public Library, and Library of Congress. I guess the special advantage that the in-house system has is that its owners are free to develop the way that they see best for their particular library, and this was illustrated in the different paths that these four had taken.

Ohio State has the earliest of the systems, called the LCS (for Library Control System). It began life in the early '70s as a circulation system and has since added other features of which the on-line catalogue is one. The system supports 200 library terminals for OSU and for the Ohio State Library on a shared university mainframe machine. They have 1.9 million titles loaded and have committed themselves to the on-line catalogue to the extent of closing off their card catalogue. One interesting use they make of the new technology is that they maintain five phone-in reference units - each consisting of a librarian, a terminal, and a telephone. Any staff or student can ring and ask the librarian to search the catalogue for them on the spot. If they have a campus address (and most of the 50,000 students live in) they can ask for any items from the search to be mailed to them. The service is very popular.

Northwestern is a later example of a university library building its own integrated library system - cataloguing, acquisitions (including serials check-in), and on-line catalogue display, with circulation being next on the list for inclusion. They started on a shared university machine but later transferred to their own computer - they do 40,000 searches a day on 83 terminals and claim to have no overload problems. In the main catalogue area they have a bank of seven terminals near the very large card catalogue which they have recently closed off. I observed users in this area on three separate occasions, and while the terminals were heavily used, often with people waiting for a free one, I did not see a single person at the card catalogue on any of the three occasions.

Pikes Peak Public Library is an interesting one. They have had to take short cuts to get 96 terminals on a PDP/11 mini, and consequently the on-line catalogue is rather crude compared to the others I saw. Where Pikes Peak has stretched the library world's awareness is in the area of access. They had terminals in supermarkets and citizens advice bureau offices; they have other files available besides the catalogue - bus timetables, public and

private daycare facilities, car pool information, and jobs vacant in the district; and all this information is also available to home users who have their own micros.

The Library of Congress have also developed their own systems for public access to their catalogue, notably the SCORPIO system. Like Pikes Peak they have widened the scope of data that they allow public access to. They not only have catalogue material (English language material since 1968 and other languages since the mid-seventies) but you can also get at a file of periodical articles and government documents on public policy and current events, a legislative information file containing the full text of the last five congresses, and the National Referral Centre file.

Another strand of development in on-line catalogues is the consortium approach, and here I saw the two most sophisticated systems of the tour - one covering the nine state universities in California, and the other covering the eight state universities in Minnesota.

California's Melvyl system is a beautiful one - it has been called the Rolls Royce of the OPAC systems. All the statistics on this system are mind-boggling. It runs on three large mainframe machines each with 8mb of on-line storage and with a total disk storage of 10,000 million characters. When I was there it was running 300 terminals but they had plans for 1300 more. They only had 3/4 of a million titles on-line at the time but they were just about to re-load and double that figure. And all of this effort was going solely into catalogue display. If ever there was a commitment to the concept of the on-line catalogue this is it. Their commitment was not only expressed in terms of size but also in the high level of sophistication and sensitivity of design. I wish I had time to describe this system in detail. All I can do is summarize and say that it supports boolean keyword as well as traditional access, a sophisticated user mode and a new user mode, it gives a great deal of power to the user to control the dialogue and to select the type of display, and it tailors its on-line advice to the particular search that the user happens to be doing.

The Minnesota system (often called the Mankato system since it originated on that particular campus) is very similar in system concept. It runs on one of the three mainframe machines shared by the eight universities, and shares this machine with other academic applications. It runs a database of 1-1/4 million titles (last year's figures) with 115 catalogue display terminals attached.

Obviously both systems double up as union catalogues for the libraries involved.

The next strand of development is the one which is likely to be the most influential in the '80s and that is, of course, the turnkey package systems. Most of you will be familiar with such systems from demonstrations over the past year. In Australia you have the choice of Urica, DataPhase, LIBS100, VTLS, Datapoint, Stow, Technocrat and Ulisys with the possibility of GEAC also entering the Australian Market. I visited libraries with DataPhase, Ulisys, LIBS100, and GEAC packages installed, but I won't go into detail about each of these. Since they all started as circulation systems they have a facility for on-line inquiry into the file to find out what is on loan and this fulfils the basic function of a public access catalogue, and they are each at different stages of refining this access to allow easier use by the public. I only visited installations where these systems are being put to use as on-line catalogues and found the public generally very happy with them.

The turnkey systems have the disadvantage, as compared with the home-grown system, of being inflexible - you don't have the same level of control over your own destiny - but against this you must weigh the advantages of overall price and speed of installation and a very impressive level of design sophistication.

The initial surprise is that so few of the owners of turnkey systems are using them for on-line catalogue display - they've paid for the software, why not use it? One reason, of course, is that the concept is still new and they haven't given it very much thought. But a more lasting reason is that they feel that they cannot afford enough hardware to run a number of applications. Velma Veneziano of Northwestern stressed this to me in saying that the real problem that the turnkey vendors face at the moment is hardware performance - you may buy a package which boasts being a total library system, and then find that you can only afford to run acquisitions and public access, or circulation and public access, but not all three. One answer to this is sharing, and Veneziano predicted that small consortia of up to 10 libraries sharing a system will take the place of the large regional consortia as the basis for machine-based operations. In this context I talked to the Director of the Colorado Association of Research Libraries in Denver. This consortium of seven university and college libraries was installing a large DataPhase system specifically to supply on-line catalogue access to the patrons of these libraries.

Finally I should mention two developments that don't easily fit into the categories of in-house, consortia, or package development. The first is Dartmouth College on-line catalogue which is a locally produced envelope around BRS STAIRS which is the software used by Ausinet. The Dartmouth leads the user by the hand and then translates his request into STAIRS commands and directs the search through the STAIRS software. The second unusual system is Beth Israel Hospital's Paperchase system which is a locally produced and beautifully friendly on-line catalogue with a unique feature that it is mainly used to access the library's periodical articles, the data being fed in from NLM tapes.

I have not spent as much time as on previous occasions talking about the different features of the on-line catalogues because I wanted to lay particular emphasis this time around on the availability of this technology. It is well and truly with us now, and your range of choice is bewilderingly rich. You can write your own system, and some of the places I've talked about demonstrate that this is still a viable option, particularly with the help offered by database management software these days. Or you can hire a programmer and take over one of the existing homegrown packages - both Ohio State and Northwestern have made their systems available and both have been replicated elsewhere. At the consortium level the two options of creating or replicating are also available: the Mankato system is available for purchase through Univac, and, being written in standard Cobol, is transferable to other machines without insuperable difficulty; and a version similar to University of California's Melvyl is also on the market. Finally, of course, you can buy a package off the shelf and, if the economics demand it, you can share the cost over several areas of the library or with several other libraries.

Well having said that they are available are they worth it? What reasons can we give for making the changeover? Let me make a few general comments about the on-line catalogues as I saw them.

In observing the systems in use the most obvious and inescapable fact about them is their popularity with the user. People really do like them and move very quickly from the card catalogue when both are available. Any number of reasons can be put forward for this popularity.

Freedom from the need to look for the needle in an alphabetic haystack is an obvious one.

Mechanical ease is a more surprising one - apparently they find that one finger typing of a couple of words from a title is less annoying than peering into packed catalogue drawers and writing on top of the cabinet while holding a finger in the drawer, or coping with the conjuring tricks of the microfiche reader.

Flexibility of presentation probably wins hearts too: the user is normally presented with brief and unconfusing information about a title with the option of getting the full treatment if they want it - and even the full form is usually presented in a nicer format than we can afford in the traditional forms of catalogue.

Speed is a consideration too. It is pleasing to have the information presented to you immediately instead of having to hunt for it. We have spent a lot of automation money in order to save our own time - this one saves time for the users and they appreciate it. I also observed that it had the effect of making them more tenacious in their subject searches. Even with LCSH and no reference structure they seemed to tolerate a few more deadends before giving up. I wonder how many users make full use of subject reference structures in card and microfiche catalogues.

Also of course status information in the catalogue is a very valuable addition - that is, knowing that an item is on order, in process, at binding, on the shelf, or on loan. We may be in danger of letting the user feel he has control of the situation. What a pity to strip away all the mystery!

Whatever the reasons for user preference it is quite undeniably there, and this brings up an economic justification that I think we often don't take sufficiently into account; even a relatively small library like Deakin has some $8 million worth of paper on its shelves; if we can make this capital investment in stock work, say, 10-20% harder year after year then that has to be worth putting a bit of development capital into.

I noticed another very surprising thing, and this was that the popularity of particular systems did not seem to depend on my ranking of their ease of use. The more difficult ones were often more popular. The Library of Congress and Ohio State systems I found among the more difficult to use, but both were very actively supported by hovering reader services people.

Mankato was less finely designed than the University of California's Melvyl, but reader education programs over the previous few years had resulted in about 70% coverage of students and I saw evidence of the 70% teaching the other 30%.

From what I gathered one potential advantage that should not be stressed too heavily at this stage is boolean keyword search. It was stressed to me on a number of occasions that on a file of any reasonable size, say over 100,000 titles, the minis that are currently available won't support this option with acceptable response time. Even GEAC, which tends to support the upper end of the package market with powerful minis don't support boolean keyword searching. Their solution, which I think is a very reasonable one and one which had been suggested to me elsewhere as the path to take, is to offer this function on a separate linked machine. If you want the function you buy the machine to run it on. Fred Croxton of the Library of Congress had another variation of this principle: you split the database itself along usage-related criteria such as language and time, and offer fast powerful service on the most active segment of the file. Even if the technical problems are solved, my observation of users at the few systems that did offer boolean search suggested to me that we are not yet ready to unleash this on the public. I saw users getting into an awful tangle with unmanageably large retrieval sets. Perhaps the [illegible] of the moment is to run pilot projects to refine our concepts about this type of public access searching so that we will be ready when the technology is.

I'd like now to attempt a brief summary of where we are in Australia with on-line catalogues. What I did was to ask a colleague in each state to ferret around for me. I'd better not expose their names in case they missed someone in their state and get blamed for it, but I'd like to thank them for their help.

In Queensland I have been unable to find any on-line catalogues running at the moment. QIT seems to be the closest with the possibility of running at least 1 terminal from its DataPhase system on a trial basis in 1984. The State Library's ORACLE system has no current plans in this regard. University of Queensland has a prototype running for library staff and plans to go public in November 1984.

In N.S.W. Ryde Public Library has an order in for the special Urica OPAC terminals for early 1984 and Wollongong Public Library is running public access on its LIBS100 system. I believe there is a deal of activity in the special libraries area but didn't have time to follow this up specifically. CLANN is about to go to tender for a system to replace microfiche for the colleges and expects to be operational by late 1985.

In Victoria there is a lot of activity. Box Hill and Caulfield public libraries and Melbourne University and RMIT all have Libs100 terminals out for the public. Other Libs100 public library customers planning to put terminals out in 1984 are Peninsular, Bendigo and Eastern Regional. In the TAFE Colleges both Preston (with Urica) and Gordon (sharing with Deakin) have public terminals out, and Deakin and Chisholm both use their DataPhase systems for on-line catalogue display - Chisholm now seems to be the largest installation in the country in terms of the number of public terminals with 12.

The most notable example in South Australia is, of course, the University of Adelaide who were pioneers in this area. They currently have 10 terminals available to the public. Norlunga Public Library, who share a DataPhase system with the State Library intend to go public as soon as their file is a little clearer. SAERIS has one public terminal in operation as has Unley Public Library. Tea Tree Gully public library has 4 terminals out for the public. All of these are on locally-written systems. Burnside & Woodville public libraries have the Stow system and maintain on-line enquiry through the reference desk with the possibility of direct public access in the near future.

In Western Australia WAIT has on-line enquiry for library staff and expects to extend this to the public early next year and Murdoch has recently been demonstrating its integrated system and I believe intends to go public.

The University of Tasmania on its Urica system intends to test the water first term next year.

Finally I would like to list some of the paths that I think the on-line catalogue will lead us along during the '80s. I will not have time to do more than list them, and you may disagree with some or many in the list. But I think that the cumulative effect of them illustrates Hildreth's point that we have here a radically new vehicle of communication.

First there will be a blurring of the traditional distinctions between library files. The on-line catalogue will be a window to the underlying total library system, thereby leading to a de-mystification of libraries with a consequent increase in their volume of impact on the public and a possible impact on professional roles within the library. The rate of questioning in the profession about data content and data organisation will increase due to the increased practicality of implementing any new ideas. I would expect questioning and real changes in subject access, analytic entry and related areas such as thesaurus-controlled abstracting, and I would hope that libraries, before the end of the 1980s, would be offering catalogue access to their periodical holdings at the article level rather than at the title level. I would expect a blurring of the distinction between local holdings information and reference data in that, like Pikes Peak and the Library of Congress, both the library's inventory file and certain selected reference files (for instance, local Citizens Advice Bureau files) will be accessible through the same medium. Similarly I would expect a blurring, in the minds of the users, of the distinction between the holdings of one library and another - if three or four libraries in an area share a system and allow public access to the total collection, their public will not unreasonably expect access to the material itself as well as to information about the material. This process has been going on through our practice of interlibrary loan, but we have been able to keep it under control by making it difficult to use. To take this point along another track there will be a blurring of the nice clean demarcation lines of the '70s with regard to national and regional networks, not only in geographic terms but in functional terms also - authority control and union catalogue functions and even first-use data capture functions may be dispersed in comparison with current models. With the event of dial-in facilities for personal computers and with local area networks, access points to library collections will be dispersed beyond the walls of the holding institution itself and new forms of service will have to keep pace with the new modes of access.

I believe we have a tiger by the tail here - a challenge beyond any that we have ever had to face before in the history of the profession. I hope that we will be equal to the task.

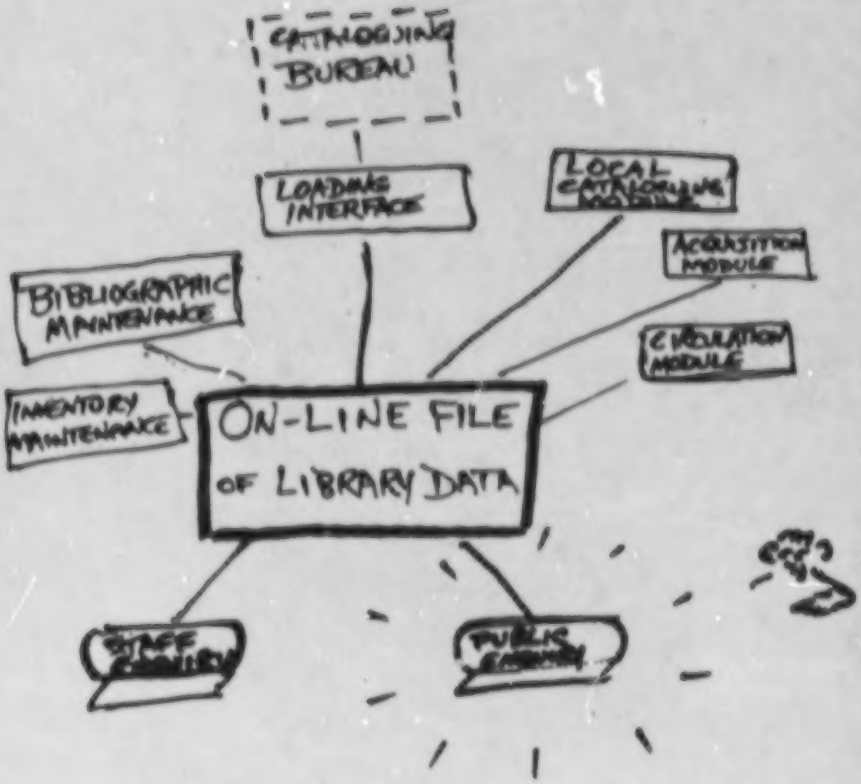
1. Fayen, Emily Gallup The On-line Catalogue: Improving Public Access to Library Materials. Knowledge Industry Pubs. Inc., White Plains, 1983.

2. Hildreth, Charles R., On-line Public Access Catalogues: the User Interface, Dublin Ohio, OCLC, 1982.

3. Matthews, Joseph, R., Public Access On-line Catalogues, Weston, Online Inc., 1982.

4. Mays, Anthony H., Public Access Catalogues in the United States. Report of a visit made under a University Administrator Grant from the Australian-American Educational Foundation April-June 1982.

NH/MC
25/11/83
252X


CATALOGUING BUREAU
LOADING INTERFACE
LOCAL CATALOGUING MODULE
ACQUISITION MODULE
BIBLIOGRAPHIC MAINTENANCE
CIRCULATION MODULE
INVENTORY MAINTENANCE
ON-LINE FILE OF LIBRARY DATA
STAFF CONSOLES
PUBLIC CONSOLES

INSTITUTIONS VISITED

1. University of Chicago
2. Pikes Peak Public Library ('Maggie's Place')
3. University of California Berkeley (MELVYL)
4. Chicago Public Library (DataPhase - on Tandem)
5. Evanston Public Library (CLSI)
6. Ohio State University (LCS)
7. New York University (GEAC)
8. Beth Israel Hospital (Paperchase)
9. Mission College California (ULISYS)
10. Stephen F. Austin State University Texas (DataPhase)
11. Mankato State University
12. Northwestern University (NOTIS)
13. Guelph University (GEAC)
14. Dartmouth College
15. Library of Congress
16. University of Chicago Library School
17. University of Toronto Library
18. New York Public Library
19. DataPhase Systems Inc.
20. Stanford University (RLG)
21. Online Computer Library Center
22. AMIGOS Bibliographic Council
23. Colorado Alliance of Research Libs (CARL - DataPhase)
24. Joe Matthews & Associates.

PUBLIC SECTOR/PRIVATE SECTOR INTERACTION IN AUSTRALIAN INFORMATION POLICY

Peter J. Judge

Officer-in-Charge, Central Information,
Library and Editorial Section, CSIRO.
P. O. Box 225, DICKSON, A.C.T. 2602
AUSTRALIA

Telephone (W) 062 684317
(H) 062 496396

Abstract

This paper was originally written for the Australian Libraries and Information Council as a contribution to the dialogue on national information policy. Its message is that the "national" information policy cannot confine itself only to government activities; the private sector is already growing faster in this field than government, sometimes in cooperation, sometimes in competition. A review of the public sector/private sector debate overseas concludes that government should be deliberately interacting more with the private sector and doing more to provide the framework for future orderly development. Such a framework is foreshadowed in the Australian Labor Party platform, and action has recently been initiated to implement the information policy in that platform.

PUBLIC SECTOR/PRIVATE SECTOR INTERACTION IN AUSTRALIAN INFORMATION POLICY

"Each Federal agency concerned with science and technology must accept its responsibility for information activities in fields that are relevant to its mission."

"We must always seek to ensure, on behalf of both the Federal Government and the technical community, that the Federal information system remains adequate but does not overwhelm the existing non-Government systems, and that our Government and non-Government systems continue to develop into an effectively interwoven instrument that is always responsive to the changing needs of our science and technology."

The "Weinberg Report", 1963.

1. BACKGROUND

The first Sputnik, on 4 October 1957, took the world by surprise and shocked Western scientists and administrators. A part of that shock came from the realisation that it need not have been a surprise - that the Soviet technological achievement could have been predicted by a thorough and perceptive use of the open scientific and technical literature. A part of the reaction was the determination to bring this literature into more effective control and use, so that such shocks could not recur.

The Weinberg Report,(1) on "Science, Government, and Information", was not the first statement of a national information policy in the USA: it followed the 1958 Baker Report, a 1960 report of a joint Congressional and Senate sub-committee and the 1962 Crawford Report;(2) significantly, these were already nearly 40 years behind Lenin's 1921 initiative in setting up a national foreign publications acquisition policy, to exploit the findings of capitalism to fight capitalism. The Weinberg Report became, however, the first step which led to the development of the concept of information policy world-wide when it was used as the basis for the proposal by the US delegation to the OECD Science Policy Committee in late 1964, that an "Information Policy Group" should be established.

The Group was instructed to examine the need for this kind of policy, and if appropriate to promote the development and application of compatible policies in OECD countries. Twenty years later, it is difficult to appreciate that the concept of science policy had only been introduced at the beginning of the '60s, and many countries still felt uneasy about Science - outside the defence area - as a proper field for government intervention. They felt even

more uneasy about "information policy", a term which translated awkwardly into other European languages and seemed to have vague undertones of spying*...

However, the Information Policy Group was successful in most of its fields of activity, and seven years later an initiative of the International Council of Scientific Unions with UNESCO would launch the UNISIST program along much the same path. The Group's success was limited, perhaps, by following too closely the lines of the Weinberg Report. Weinberg's greatest practical impact came from the recommendation which is the first quotation at the head of this paper; the second quotation was buried in the text near the end of his Report, and was more easily overlooked.

Thus, the Information Policy Group saw "national policy" as largely synonymous with "government policy", and so restricted itself mainly to considering services operated by government agencies. It also concentrated for much of its 10-year life** on science and technology, neglecting the huge questions related to the business-orientated information services which were developing in the private sector. Information services were viewed as if they existed quite apart from libraries, so that the Group helped for a time to perpetuate the gap which had already been long evident in such situations as the UK Library Association versus ASLIB versus the Institute of Information Scientists, or the American Library Association versus the American Society for Information Science, or similar divisions in many other Western countries. Although the big computer-based scientific indexes were by-products of the printed publications, their databases were seen as something sufficiently different in kind as to warrant quite separate consideration. This view has now changed, and database activity, whether factual, bibliographic or whole-text, is seen simply as electronic publishing, hence as a natural evolution using today's technologies of the publishing processes which began before Gutenberg, and hence very much of interest to libraries wherever the subject matter is relevant.

---

*In this light it is interesting to note that in Sweden recently Dedijer and Tell have been calling for information policies in developing countries to encourage "intelligence gathering" operations, a terminology which may not attract universal favour.

**In 1975 it merged with its sister body, the Computer Utilisation Group, and developed eventually into the Information, Computers and Communication Policy Committee.

Neglecting the non-government sector led to problems, of which the most conspicuous early example was the clash between the US government National Library of Medicine MEDLARS service and the Dutch private sector Excerpta Medica. These covered much the same territory, and to complicate the issue further a part of Excerpta Medica was published under contract to the US National Institutes of Health. The OECD interest in and support for the MEDLARS system was seen as unfair by Excerpta Medica, at that time a profitable venture run by a not-for-profit foundation, but later taken over by the big Dutch publisher Elsevier. Eventually this unfairness became the subject of Dutch diplomatic representations to the OECD (which bore fruit) and to the US government (which did not, and which have still not been fully resolved).[16]

By the late 1960s information services were seen to be developing in three distinct groupings: in the public sector, in the private not-for-profit sector and in an actively growing private for-profit sector. In the USA these groupings were particularly marked, and each had its own forum. Government services had meetings arranged by the White House or the National Science Foundation. The not-for-profit group set up its National Federation of Abstracting and Indexing Services (NFAIS), and its members also met their overseas colleagues in the International Council of Scientific Unions Abstracting Board. The for-profit services established an Information Industry Association to provide mutual support and to act as a strong lobby group vis-a-vis the government; both these objectives were speedily attained.

Nowadays it is clear that the private sector in most Western countries is expanding much faster than the public sector in the provision of services which gather, store, process, interpret and distribute (or "market") information and data. The "on-line market" is already estimated to be worth around $2 billion p.a., and is expected to reach $5 billion by the end of the decade. With such sums at stake it is not surprising that major publishers around the world are investing in this technology. It is no longer tenable in these Western countries to exclude the private entrepreneurs from considerations of <u>national</u> policy: the interactions and responsibilities of the two sectors are recognised as key elements of such a policy.

2. CURRENT ISSUES OVERSEAS

The debate is already strongly engaged overseas. The chapter on "Interaction between the Public and the Private Sectors in National Information Programs" by Berninger and Adkinson[17] in the 1978 Annual Review of Information Science and Technology (ARIST) lists 103 references from 1958 to 1977. The 1982 ARIST has a similarly-titled chapter by McDonald,[31] which brings the discussion up to date with an analysis of a further 33 references from 1977 to 1982. In Europe, the European Information Providers Association (EURIPA) has just published the proceedings of its 1982 symposium on "Defining Public and Private Interests in the European Information Industry".[6]

The next section of this paper will examine some of the arguments which are emerging from these and other recent publications, where appropriate adding a brief note on the national information policy mechanisms and any attitudes these may have expressed on the private sector.

a) The United States

McDonald[3] drew particular attention to the very comprehensive nature of the report by the National Commission on Libraries and Information Science (NCLIS, 1982) on "Public sector/private sector interaction in providing information services".[5] The sixteen members of the NCLIS Task Force were almost unanimous on most of the 27 recommendations, which were grouped under seven Principles which spelt out the Task Force's message. Briefly summarised, these Principles stated that the Federal government should:

- take a leadership role in creating a framework for information service development and use;
- establish procedures to encourage private sector investment in information services;
- not provide information services commercially unless there are compelling reasons, and the private sector is protected;
- protect private sector property rights in relation to government use of private sector information;
- make government information available to the private sector, without constraints on subsequent use;
- set its pricing policies so that these reflect true costs, and submit these to independent review;
- use existing mechanisms, such as libraries, for distributing its information to the public, rather than set up new ones.

The two recommendations which gave rise to a split vote both dealt with problems caused when the government operated services:

#10 "Encourage Federal agencies to regard the dissemination of information, especially through the mechanisms of the private sector ... as a high priority responsibility" (some members of the Task Force thought that the reference to the private sector might be overlooked);

#23 "Do not arbitrarily restrict the Federal government from enhancement of information products and services, even if solely to meet the needs of constituencies outside the government itself" (the circumlocution here was an attempt at compromise, accepting that some "constituencies" - eg. the handicapped or the disadvantaged - might need special support from government.) (The other recommendations are summarised in an Appendix at the end of this paper).

McDonald applauds the Task Force for its even-handed discussion and scrupulous fairness in presenting its results, although he points out that this even-handedness may hinder effective action on the recommendations. However, the battle-lines are drawn: government

sees information services as one of the appropriate means available to it of fulfilling its policy objectives, but this view is being challenged by the information industry: "The business of Government is government..." The corollary, that all "commercial" business is the business of the private sector, is one that can be applied far beyond the provision of information services, and the question of how the responsibility for information services can be shared is unlikely to be resolved (says McDonald) while the wider issue remains.

One piece of recent US legislation which is highly relevant here has the innocuous title of the "Paperwork Reduction Act" (P.L.96-511, December 1980).[7] The bill sets up an Office of Information and Regulatory Affairs in the Office of Management and Budget (OMB). There is a Federal Information Locator System which enables departments to see whether the information they need already exists, and new procedures for review, elimination of duplication, and assessing the paper-work impact of new procedures. A consequent OMB document[7a] emphasises that information resources management encompasses the total information life cycle from collection to distribution, and that information is an economic resource which should be managed as such. Twenty-six Federal agencies heavily involved in information activities are reviewed, one goal of the reviews being to eliminate Federal information activities that duplicate private sector sources, others being to explore the necessity for the information activities, to see whether some services can be merged with others, and to ask whether full cost recovery is achieved.

Another OMB document, Circular A-76,[8] sets down specific guidelines on which Federal commercial activities should be managed in-house and which by private sector firms under competitively awarded contract. Although the Circular does not refer to user charges or cost-recovery, it explicitly includes a wide range of information products and services and is accordingly being used by the US information industry to press its case for greater involvement by the private sector in Federal information activities: cost effectiveness and quality of service should be the main criteria for determining whether the work is done inside or outside the government.

Melvin S. Day, while Director of the US National Technical Information Service (NTIS), declared that "NTIS will be a partner with the private sector, and not a competitor",[9] but thereby posed a dilemma. NTIS makes a variety of services available to private industry, which can "add value" in some way and market a new product to its clients. Some private sector hard-liners would like to take over all government information operations. However, many of the activities performed by government in pursuit of its policy objectives are unlikely to be commercially viable. If the private sector only retained the profitable services and dropped the rest, either the uncommercial activities would not be performed (to the possible detriment of "open government", or of good service to the community), or else the government would be left with a ragbag of unprofitable services which would be difficult and expensive to administer and frustrating to operate.

The US government is in fact already funding some 79 private sector-operated services, and of the 117 services identified in-house is contracting many functions from printing to distribution out to the private sector. However, of these 79 services, only 12 were performed by commercial organisations (the remainder by academic or other non-profit bodies), accounting for only 2% of the Federal information budget.[13] It seems that either the government or the for-profit community is not entering into the spirit of OMB A-76.

The question of fair levels of charging for government services to avoid unfair competition with the private sector is also difficult to resolve. The meaning of "full cost recovery" may be different in government accounting systems and in commercial practice. The US Senate introduced a bill (S.800) in 1981 requiring MEDLINE charges to reflect "full costs" (a partial answer to the criticism of Excerpta Medica and others).[10] The National Library of Medicine opposed this at the time; in fact it has now (April 1983) nearly achieved full cost recovery, although its prices are still lower than those of its commercial competitors.

The US Office of Technology Assessment (OTA) has upheld the present NLM pricing policy,[11] stating that if MEDLINE were discontinued there were no grounds for supposing that the private sector would re-create it, that the citations in MEDLINE and related NLM databases do not directly duplicate those in commercial databases, and that some diversity of biomedical data may be advantageous. Meanwhile, the private sector concerns are unresolved: NLM continues to dominate the market without changing its range of databases, its prices for leasing tapes, its provision of direct on-line access to its tapes and its pricing for that access.[11]

Part of OTA's reasoning is based on its analysis of current trends in information technology, which may make some of the private sector's concerns about NLM obsolete within a few years. These trends include:

- the widespread use of inexpensive microcomputers;
- distributed computing rather than time-sharing, using large cheap memories such as videodiscs;
- new services based on distributed computing, such as the sale of MEDLARS videodiscs, and of floppy disc-based up-dating services;
- integrated communications networks mixing data, full text, voice and other transmissions;
- new concerns about copyright in these complex networks;
- new services such as the retrieval of full text and raw data, and eventually automated search.

The OTA conclusions seem to be that this is the wrong moment to introduce constraints that may hamper research and development; that the existance of MEDLARS may prompt new (competitive) services in the public and private sectors within the USA rather than elsewhere; and that the effects of immediate intervention in these processes would be unpredictable. Long-term legislation, if it is to be

effective, must seek to anticipate new technology and new applications.

R L Chartrand,[41] of the US Congressional Research Service, reviews the inherent management responsibilities of the Federal Government in relation to information programs under eight headings:

1. Role definition: demarcation of various government (Federal-State-local) and non-government functions.

2. Policy creation.

3. Program implementation: "energizing an operational mechanism" does not necessarily imply the government as the operator of the program.

4. Long range planning.

5. Information resource management, as described above under the Paperwork Reduction Act and the OMB guidelines.

6. Program Monitoring and Analysis.

7. Coordinating Mechanisms, essential to establish some level of cohesive action within the information community, public and private.

8. Public relations, specifically to relate the programs to the public.

Chartrand concludes that "there is a veritable library of insights, analyses, recommendations, and prognostications which cover virtually every facet of public and private sector activity... Governments everywhere, if they are to sustain their vital role, must listen as well as lead."

b) Japan

Japan is intensely concerned with information production and use.[12] Out of the total of about 28000 Japanese periodicals, 9000 deal with the "hard sciences"; in the broad field of information technology, in 1981 there were about 1800 titles dealing mainly with this topic, increasing at 10% p.a. It has an impressive network of libraries, and a recent handbook lists nearly 9000 information sources. The library developments are coordinated by the National Diet Library, and other information matters are mainly shared between three agencies: the Ministry for International Trade and Industry (MITI), the Japan Information Centre for Science & Technology (JICST) and the Japan Documentation Society (NIPDOK), these two latter bodies being under the supervision of the Science and Technology Agency.

The Japanese government is working in this field through a number of large companies, notably the Nippon Telegraph and Telephone Public Corp. (NTT), but the results of the joint tasks are available to all

and there are political and financial measures which ensure that small firms can obtain support and that they are not exploited by foreign investment.

c) Europe

In 1979 the d'Avignon Report on "European society faced with the challenge of new information technologies: a Community response"[135] drew the attention of the Western European countries to the fact that although they then used about 25% of the world data flow, they only supplied about 15%.[136] There was a serious and worsening imbalance of payments. Maxwell, the Chairman of Pergamon Press, said two years later that the European on-line databases industry was dominated by the three leading American suppliers - Lockheed, SDC and BRS. Economically, the market was but a tenth of that in North America, accounting for at best half a million searches a year. While the 36 host suppliers then linked to Euronet might be considered the basis for a competitive system, nearly all of them were heavily public-funded, highly specialised and no real threat to the Americans.

The d'Avignon Report was intended to be one of a series of such reports, looking particularly at the crisis industries such as steel making and textiles and the growth industries such as information. The Community was urged to generate a climate of innovation, create a large homongeneous market for information technology, promote a European information industry, foster collaboration, and so on. Euronet was a good example of the kind of action envisaged, setting a target for the European PTTs to achieve common standards and tariffs in their national packet-switched services, after which "Euronet" will disappear. "DIANE" (Direct Information Access Network for Europe)[137] is the information service operated through the inter-connected national packet-switched networks by a number of "hosts" each providing access to databases: a total of 370 databases from the 40 hosts in March 1983.

The European private sector is still concerned that there are too many subsidised services on Euronet, which prevent fair competition, reduce profitability and inhibit innovation. The big three American hosts have 56% of the European market, but private sector spokesmen say that European governments are at fault when they fund research institutes, universities and their national libraries to provide quasi-commercial services rather than encouraging the private sector activity. Thus, the European Space Agency Information Retrieval Services has "the lion's share of what the US on-line operators leave us in Europe" (comment by Gibbins of Pergamon).[138] Like their US competitors, the European private sector recognises the importance and necessity of government action in particular areas: contracts with private industry, tax concessions to encourage both the innovative suppliers and their users, educational and promotional activities, stability of policies and tariffs, watching over the implementation of sensible copyright legislation, and occasionally encouragement by example: in this connection the European Commission's Integrated Services Information System (INSIS) received favourable mention.[139] INSIS will be an advanced information and communication system for Community institutions and

key national departments in fields such as legislation, statistics, customs and excise and education.

An early indication that the level of database activity is already much higher than appears on the surface was given in 1979 when the European Commission published a "call for proposals"[18] addressed to database producers who were developing products but needed an injection of extra funds in order to become operational. To its surprise, the Commission received 266 requests totalling $20 million, and representing $90 million already invested in these systems. It was able to support about a tenth of these requests, deliberately choosing mainly numerical or factual systems in fields of business interest. A second call for proposals in July 1982[19] has attracted 170 proposals worth about $100 million; 118 of the proposals were in the trade and industry sector, and this concentration contrasts markedly with the earlier emphasis on science and technology.

Besides giving money to encourage database developments, the Commission is promoting new technology, such as its ARTEMIS project to explore the potential of digital text transmission as a means of document delivery.[20] Others in the European private sector have tried the same path: a consortium of Academic Press, Blackwell, Elsevier, Pergamon, Springer and Wiley proposed an "ADONIS" project as their response to ARTEMIS.ADONIS[14] would store the full text of journal material, already available in digitised form from its computer typesetting, on digital optical discs from which the texts and graphics of individual articles could be transmitted electronically on demand for a modest fee, to the user or to a nearby centre. This fee would provide some return to the publishers, who are currently losing vast sums from the unregulated photocopying of their journals (nearly 3 million requests satisfied annually by the British Library Lending Division alone). ADONIS could also provide a better service to the users and ease the load on major libraries which face growing demands for more difficult material referred to in the various electronic information services. Pilot studies have been undertaken in collaboration with the British Library Lending Division, and the consortium has approached publishers, major libraries and "document fulfillment centres" to participate in the project. However, although this project seemed set to proceed,[21] both Wiley and Academic Press have now withdrawn. The other participants agreed in February 1983 to put ADONIS in cold storage pending the resolution of doubts about the anti-trust implications and about profitability in the U.S.A. Meanwhile, in the UK the Publishers Association has set up a company called the Publishers Data Base Ltd to examine a similar concept, and the UK Department of Industry is examining the use of Teletex coupled with facsimile as an electronic mail service with document delivery back up (the HERMES project, being evaluated by PIRA and the National Physical Laboratory).

Some time ago the European Commission announced its intention to offer off-line automatic translation of the references retrieved from Euronet DIANE,[22] using the well-established SYSTRAN system whose inventor was in Australia a couple of years ago to show us

examples of his work, which looked good. SYSTRAN claims 90% intelligibility straight from the computer, and a subsequent 20% revision by a human translator. The Commission has also been working on an in-house automatic translation system called Eurotra, for which it claims 99% intelligibility and less than 10% revision. Agreement was signed in November 1982 for a 5-year program to perfect Eurotra[23] with a million pages a year to translate into its seven official languages, the Commission is looking for savings of up to 75% in its translation costs.

Finally, the system of national packet-switched networks arising from the Euronet initiative has also been an effective carrier for Videotex information services. In the agricultural sector, for example, there is interest among European farmers in information services developing on the French Teletel and the German Bildschirmtext, and accessible in most of the nine member countries of the EEC[24]. This has wide marketing potential for European "agribusiness" which goes far beyond the simple provision of information.

The United Kingdom

The British Library is no longer responsible to the Ministry of Education but through an Office for Arts and Libraries[25] to the Chancellor of the Duchy of Lancaster, a Cabinet Minister. The Office is small - only 30 staff - but has a vote of $1 billion. Advice on the development of services comes from a Library and Information Services Council (prior to August 1981, the Library Advisory Council) with representatives of local and central government and of publishers. Policy "alignment" among the Ministries is the task of an Interdepartmental Committee, mainly involving Education, Science, Industry, Environment and Health, and their related Qangos. (This IDC also prepares the briefs for the EEC meetings.)

The UK has a special Minister of State for Information Technology in the Department of Industry, concerned with general hardware and software options. His office has already awarded about $130 million for direct support to information technology and $200 million to a microprocessor applications project. 1982 was designated Information Technology Year.

The British Government has been watching the US experience regarding relations with the private sector, conscious that "all governments are incompetent, including Conservative governments, so the less they are given to do the better.."* A policy of contracting out wherever possible has long been followed by the British Library and

*Comment by John Peyton during the debates on the nationalisation of the UK steel industry, and quoted by Sir John Osborn, a Conservative M.P.[25]

its predecessors (although not always giving the contracts to the for-profit sector). For example, the early work on MEDLARS was performed in cooperation between the University of Newcastle and the then National Lending Library in Boston Spa, and a long succession of OSTI and BLRDD research contracts has maintained this tradition.

The tradition, however, does not go far enough for the private sector in the UK, which sees the government as subsidising or operating too many systems itself and recovering less than the true costs of these systems.[(17)] There is also criticism of "the wealth of statistical and factual information which lies locked in the vaults of London (and Paris, Rome, Bonn, etc)", which if released by the government departments concerned could be marketed by the private sector on a value-added basis. Thus, in Britain there are trade, import, export, manufacturing and census data, information on all trading companies and details of most land ownership - all potential grist for the mills of the British information industry. "Government is needed as an example, as a source of raw information and as an encourager of the private sector: it is not needed as an inefficient, subsidised competitor nor as an undynamic monopoly service supplier."[(18)]

France

The French government has been involved in the provision of scientific and technical information since setting up the Documentation Centre of the National Scientific Research Centre (CNRS) in 1941. Policy attention followed the OECD Information Policy Group discussions; initially in the General Delegation for Scientific and Technical Research, then in 1972 in a National Office for Scientific and Technical Information (BNIST), and since 1979 in an Interministerial Mission for Scientific and Technical Information (MIDIST), responsible to the Prime Minister through the Secretary of State for Research.[(19)]

MIDIST is seen by many critics of governmental intervention in information matters as a model development in Europe. The government recognises the "fragility" of the on-line information sector: facilities are expensive to set up and have a low immediate profitability even if successful, so that it is difficult for the entrepreneurs to obtain finance.[(17)] MIDIST has a substantial budget (about $8 million in 1980, ten times greater than that of BNIST in 1972) and can offer modest subsidies or contracts to help the early stages of information services. It can also work through the Ministry of Industry to award growth contracts (contrats de croissance) where more substantial sums are made available for 3-5 years. The effect of this distribution is to encourage big firms to diversify into information activities, rather than to create a host of small firms (if the project is successful the sum awarded is retained, if not it must be returned...)[(20)]

MIDIST encourages and coordinates the various governmental databases, services and publications, particularly those referring to the nation's cultural heritage, security and other government missions. It tries to ensure the quality of the telecommunications

infrastructure, and of the specialised hosts and databanks. MIDIST is also working with local Chambers of Commerce through a score of regional agencies to promote information transfer.

Germany

Germany was one of the first Western European countries to have a national information policy, but the rigidity of this policy - laid down in the early '70s and still substantially unchanged - is now coming under criticism. The Plan called for a network of twenty Specialised Information Centres, but in the event only eight have become operational. Comment at the 1982 EURIPA Symposium expressed satisfaction at this apparent failure: if the program in its entirety "had been forced on the German users, it could have put the German interactive information industry in a straightjacket from which it could have taken years to escape". However, a more moderate view considers that the "over-planning" had been necessary to cope with the chaos existing before 1974 to provide a framework for the substantial government subsidies.

Policy for scientific and technical information passes through an Information and Documentation Institute (GID) in Frankfurt and the Ministry for Research and Technology in Bonn. The stated policy, which is apparently at variance with the plans for the very comprehensive government network, is for a balance between the public and the private sectors: government should act where technical development is too costly for private industry, but economic interests should be subordinate to policy decisions. The government role includes the improvement of the communications infrastructure, the promotion of R & D, education, the provision of budgets for the government bodies concerned with information and the promotion of international cooperation. Government should also provide grants and subsidies to develop databases and ensure a user-friendly pricing structure.

The government proposals for the special information centres were intended to fill the gaps which had been perceived at that time, but the EURIPA comment was that as soon as any gap is seen to exist in the market, however exotic or specialised, private industry will fill it anyway if government does not pre-empt the situation "with monopolistic or heavily subsidised competition". Moreover, a recent deal between the German government information centre INKA and the Chemical Abstracts Service is said to have also offended European Community partners, who were not consulted beforehand. Meanwhile, pilot experiments with videotex and cable TV are being delayed or reduced in scale by what seems to be an extraordinary mixture of political manoeuvres between the State and Federal Governments and of failure to reach and implement a decision on methods and standards.

However, there is also a calmer attitude which admits that a state/private sector partnership exists and must continue. Although numerical and factual databases in areas of business interests are to be highly profitable, it seems that Government subsidies are vital in relation to scientific and technical

bibliographic services, of which very few can support themselves on their earnings. Moreover, if a government policy objective is to make certain kinds of information available to the public, this is unlikely to be achieved without a sustained transfusion of public funds.

Scandinavia

The four Scandinavian countries have long had a common governmental information policy and a history of cooperation in this field. Coordination was initially through a body called NORDOK (1972) whose secretariat rotated from capital to capital, and which became NORDINFO in 1977.[126] Each of the countries has its own policy body as well:

Sweden: DFI, the Delegation for Scientific and Technical Information, responsible to the Ministry of Education, but funded also from the Ministry for Industry;

Norway: the Norwegian Center for Informatics is a non-profit organisation associated with the Royal Norwegian Council for Scientific and Industrial Research, NTNF;

Denmark: DANDOK, an influential policy body but with no resources;

Finland: TINFO, the Council for Scientific Information, responsible to the Ministry of Education.

The lines of responsibility indicate that there can be little effective contact with private sector information activities, but in any case the comment in Norway was that "the information industry is not yet an industry"...[127]

NORDINFO has prompted a regional scheme among the major libraries, SCANDIAPLAN, to share subject responsibilities among specialised collections and centres of excellence, subsidising some of them where necessary to reach and maintain high standards. However, the Scandinavian packet-switched network SCANNET is straining apart. Denmark is a member of the EEC and has supported Euronet since June 1981, leaving Sweden as the main user of SCANNET; in March 1982 the Swedish network Telepak also signed up on Euronet, followed by Finland in November 1982. In these circumstances it is not surprising that one of the declared objectives of NORDINFO is "coordination of developments in the information field with those in Europe and the USA", and that this is considered as important as the coordination of national systems.[128]

3. CURRENT ISSUES IN AUSTRALIA

Information policy thinking in Australia also had some of its bases in the work of the OECD Information Policy Group. The Scientific and Technological Information Services Enquiry Committee (STISEC), which reported to the Council of the National Library of Australia in May 1973 made little mention of the private sector information sources. Nor did the report on the Australian Library Based Information

System, ALBIS, proposed by the NLA in 1975, although 14 of the submissions reproduced in the ALBIS Report are taken from the 70 or so received from the private sector (out of a total of about 400 submissions from all sectors); only two of these suggested the possibility of the respondent providing services, rather than just being a user of the networks proposed for ALBIS. The "background" section of this paper indicates why it would have been unusual at that time if a government enquiry had done any differently.

Recent papers by June Anderson (now with Myer Infoquest), Tony Klingender (ACI Computer Services), Peter Judge (CSIRO), and Diana Killen (Myer Infoquest) have drawn attention to the rise of the information industry in Australia, and some of its concerns.

Anderson[33] starts with an analysis of the "information sector" and its importance in economic development in mature economies. She shows how the Australian Press, seeing limited growth prospects for newspapers, has been seeking to diversify into cable TV or videotex. Some government action is seen as necessary to prevent monopoly control over the media. Four database networks are developing in Australia (AUSINET, I P Sharp Associates, ADP-Reuters, and the Commodity Monitor) but there is as far a shortage of locally produced databases. She identifies two commercial "information brokers", Myers and the Australian Financial Review. She explores the politics and economics of future developments in videotex, cable TV and satellite communication, and concludes that applications of the newest technologies will have to be largely imported.

Killen[43] compares Australian developments with those overseas, and expresses concern about Australian reliance on overseas systems. She questions the attitudes of State governments in relation to legal information systems; "is it in the national interest for the public sector to dictate to the private sector the terms of services it offers? We must decide just what does constitute the national interest in relation to the information industry, where to strike a balance between the creation of Australian databases and reliance on overseas data and information systems. We must also decide whether information is to be treated as just another commodity, subject to tariffs and protection policies..."

Klingender,[34] in a paper at the 1981 LAA National Information Policy Seminar held in Canberra at the end of 1981, takes a view which is recognisably like those discussed above in the USA and Europe sections. He points out that most of the information in AUSINET's memory has come from the government, and asks what rules the government should lay down concerning its use. His answer is none, unless public subsidy is involved. However, if there are to be rules, these should be clearly stated at the outset: he explained how a $5 million investment decision had to be taken in the dark because of the lack of a declared policy on the development of future public information networks.

Both the National Library and CSIRO make databases available to AUSINET on a non-exclusive basis (just as the Australian Bureau of Statistics does for a number of firms) but reserve the right to vary

the terms of the agreement at short notice. The interest of the government bodies is to maximise service to the users, but the private sector must look to its profits if it is to stay in business. This is why unpopular decisions to drop particular services have to be taken by private industry if those services do not pay their way, whatever "social importance" they may have.

Klingender would like to see:

- Fixed term exclusive contracts, since commitments to hardware last about four years;
- Release from obligations to mount databases which are demonstrably unprofitable after a fair trial (AUSINET has now developed its QUE service, which facilitates this kind of trial);
- At the least, a firm commitment from the government to a position such as that expressed by the National Library in 1981:
  - The NLA licences are non-exclusive and would be made available to other commercial operators at the same rate;
  - The NLA has no plans to develop an (AUSINET) system as long as one is available to the library community at the same rate.

In return for such licences, Klingender believes that the private sector should guarantee
- database size
- frequency update
- limits to printing
- hours of availability

In his paper he expressed concern over the decision that Telecom should withdraw from videotex, pointing out that if the alternative is to be a private sector monopoly this be even more "non-democratic" than the kind of co-existence that exists, say, between the ABC and the commercial media. He is also anxious about the constraints on value-added use of legal information which have until recently prevented development of a public computerised legal database.

In a number of papers[44,45,46] Barry Jones has drawn attention to the implications of the information society for Australia. Implicit in his writings is the concept of a strong private sector, and this comes through also in the Labor Party Platform[47] which calls in Section 1, National Information Policy (para 63d), for legislation to "define and codify ... the basic rules of reciprocity which should govern relationships between public and private systems and networks".

The importance of the private sector in Australia is evident in the results of a recent survey for UNESCO[48] which has shown about 115 publicly accessible databases or information systems of Australian origin generated in the public sector, compared with 300 in the

private sector. Most of the latter were factual systems addressed to the business community; about a quarter of the former were bibliographic databases, which (as has already been noted under Germany) are less likely to be self supporting except as part of a total integrated publishing program, and may therefore need government subsidy if they are to develop at all.

It is clear that the Australian government has already played an active part in the development of nationally important information services. It has set up, for example, the facilities for inexpensive communication with overseas and local databases. Through CSIRO, the Australian Atomic Energy Agency, the Australian Council for Educational Research, the Australian Road Research Board, and other government agencies, the Australian input to being provided into overseas databases which ensure the worldwide visibility of Australian research and access to the 98% of the world's research performed overseas on which our research workers need quick and reliable information. [137] Even without a formal policy, it is clear that government information is reaching suppliers like AUSINET and the Computer Sciences of Australia Intenet to enable them to set up some viable services based on "value added". What else is needed to establish an effective relationship between the public and private sectors in Australia?

One element which has held back the development of this relationship in the past has probably been the absence of any professional organisation to unify and present the views of the adolescent information industry in Australia. This industry is composed of large (but unknown) numbers of mainly small firms, with little contact with each other. (When the "High Technology Group" began to seek membership in Canberra, its Chairman said it was established by the response: the small firms "came out of the woodwork". [138]) Like the US Information Industry Association, or the European Information Providers Association, the Australian information industry needs a body to provide a structure for mutual support, and to lobby on its behalf. Such a body may now exist in the fledgling Australian Database Development Association, [139] formally constituted in late March 1983, but as yet only beginning to build up its membership. It is too early to predict whether the industry will support it, but if not ADDA, there appears to be no other appropriate association on the horizon.

A factor emphasised in Judge's papers has been the imbalance of payments in the Australian information trade with overseas. Every dollar spent in Australia on a DIALOG search means about $3-4 going overseas, mainly to the USA. [140] Some of this is inevitable - Australia cannot build all its own databases of worldwide coverage on the scale of, say, Chemical Abstracts - but at the moment we have very little in the pipeline by way of local databases which might help to redress the balance of payments, by the sale of tapes, or by marketing local databases on overseas hosts, as one CSIRO-produced CERERIS (Commonwealth Regional Renewable Energy Resources Information System) is now proposed for Dialog; or by setting up the machinery to market internationally attractive databases through two-way MIDAS to the world.

However, whether they can be reported or not, Australia needs to develop a comprehensive set of databases about Australia: its science, technology, commerce, society and so on. Whilst a handful of key Australian publications find their way regularly into the big international databases, much of the output of Australian research, statistical activity or other published and unpublished work remains unnoticed overseas. Two thirds of the Road Research Board's work and over 90% of the Council for Educational Research's material, for example, do not seem to justify indexing by the specialised international databases in their fields. But this local material is of particular importance to our own academic and business communities, and unless we develop and maintain the databases in Australia, much essential material will be irretrievable as soon as it is published.

The imbalance of payments and its implications have been noted in another country which is often thought to show many similarities with Australia - Canada. In 1977 the Canadian Minister of State for Science and Technology expressed concern over the balance of payments problem which Canada experiences as a user of US information services, as well as the loss of social and political control that occurs when computer services leave Canada and services have to be imported to replace them. If this trend were to continue over the next ten years, he said, Canada faces the loss of something like 30 000 jobs.[7]

Until a few weeks before this paper was presented to the VALA Conference (end of November 1981) it would have been fair to say that the only information policy activity of the Federal Government was the establishment of the Australian Libraries and Information Council (ALIC). This body was set up by the Government in 1981 to advise governments at all levels, in the States as well as the Commonwealth, on library and related information matters, with particular regard to

(a) the formulation and progressive development of a national plan for the development of library and related information services at the national, state and local government levels; and

(b) the establishment and operation of mechanisms to facilitate resource sharing in the field of library and related information services.

ALIC reports to the Conference of Commonwealth and State Ministers with Responsibilities for the Arts and Cultural Affairs. The membership of ALIC (the National and State Librarians, three nominees of the Minister for Education and Youth Affairs, and one nominee of the Minister for Science and Technology) has been criticised by many Australian library and information professionals as too narrow to be effective, and too distanced from the centres of power to exert real influence. The initial task for ALIC has been to identify the "issues" which are basic to a national library and information policy (including, of course, the issue of public/private sector interaction), but this activity has not so far been seen by the LAA and AASDIS as sufficient to justify suspending

their own work on formulating a national policy.

However, on 21 September 1983 the Government Caucus Infrastructure Committee carried a motion which aimed at implementing the Party's National Information Policy. Since then a first meeting of officials of the Departments concerned has been convened by the Department of Science and Technology. The indications are that there is pressure in Government for early action, and given the wide sweep of the Party Policy (see Appendix 2) this could have far-reaching effects.

6. CONCLUSIONS

Much of the foregoing has emphasised the tensions and conflict between the public and private sectors overseas, but in practice there is often close cooperation to the point that the distinctions become blurred. Some years ago it was suggested that we should in these cases envisage a "third sector" [40] which might result (choosing Australian examples) from:

- a partnership like SIROMATH, which is a mathematical consultancy firm set up by the actuarial firm E.S. Knight, the Australian Mineral Development Laboratory and CSIRO;

- a "mix" like AUSINET, into which both sectors are providing input, and from which they both draw revenue;

- a new firm set up by the government, like the Technology Transfer Council; or

- a public-nongovernmental establishment, a simple example of which may not yet exist in Australia.

There can be no doubt that Australia needs (and to some extent already has):

- easy inexpensive communication with overseas and local databases;

- Australian input into these overseas databases where appropriate;

- locally produced inexpensive databases providing the comprehensive deeper coverage of Australian topics which is needed for Australian purposes;

- a strong library and document delivery system - or, perhaps, systems.

This paper has argued that the developing information industry is a vital and inescapable element in Australia's capacity to meet the future, and that a national information policy must therefore take full account of the needs and aspirations of that sector. Among other actions, the government should seek

- to encourage the development of the information industry by

financial assistance, through risk capital grants or contracts where appropriate;

- to adopt fiscal measures to encourage both the use and development of services;

- to educate its citizens to participate fully in the information society, individually and professionally;

- to frame legislation to promote rather than restrain innovation;

- to state clear policies with regard to private sector information activities impinging on government;

- to avoid competition between the public and private sectors and to promote cooperation, perhaps by moves toward the "third sector" approach.

While some of these actions have undoubtedly begun, as yet they are not always sufficiently concentrated to be apparent and it may be that some mechanism is required to give them greater force and visibility. Two suggestions have been made recently to achieve this objective. At the Science and Industry Forum held at the Academy of Science in 1981, Clyde Garrow of CSIRO proposed an Information Foundation of Australia as a private non-profit body funded jointly by government, the Academies, industry and other interested organisations. He thought that this Foundation should promote the development of information technology in Australia, give consultancy help when required and promote training in the provision and use of information systems.

At the LAA National Information Policy seminar in 1981, Judge drew attention to a proposal put forward some time ago for the State of New York, to establish an "Information-related Industries Development Board", which would prepare a ten-year plan for development, seek agreement on standards and conduct a State, national and world-wide marketing survey of the potential for the State's products. Would this kind of approach be relevant to Australia?

By whatever means, something more is needed to ensure better coordination. Australia is fast reaching the point where informal chats among friends, which have so far been enough to keep the national information system on the rails, will no longer do. Somebody, somewhere, should be thinking strategically about the next ten to twenty years. Information policy in Australia will require a careful balance of overseas and domestic services, and of public and private sector activities, to ensure an orderly development of Australian information as a vital national resource. The attention now being paid to the government information policy statement may provide just this kind of strategy for action, but can only be effective if the private sector can organise itself to play its part fully in the developments which lie ahead.

F. J. Judge
January 1984

REFERENCES

1. U.S. President's Science Advisory Committee (1963). Science, Government, and Information: the Responsibilities of the Technical Community and the Government in the Transfer of Information. Washington D.C.: President's Science Advisory Committee; 1963. (Often referred to as the "Weinberg Report" after its Chairman, Alvin Weinberg).

2. Berninger, Douglas E; Adkinson, Burton W. (1978) Interactions between the Public and Private Sectors in National Information Programs. In: Williams, Martha E., ed. Annual Review of Information Science and Technology: Volume 13. White Plains, NY: Knowledge Industry Publications, Inc.; 1978.

3. McDonald, Dennis D. (1982) Public sector/private sector Interaction in Information Services. In: Williams, Martha E., ed. Annual Review of Information Science and Technology: Volume 17. White Plains, NY: Knowledge Industry Publications, Inc.; 1982.

4. Defining Public and Private Interests in the European Information Industry. A report of a Symposium organised by EURIPA and held in Luxembourg on 26 and 27 January 1982. European Information Providers Association, 79 Great Titchfield Street, London W1P 7FN, UK, 1982.

5. U.S. National Commission on Libraries and Information Science (NCLIS). Public Sector/Private Sector Task Force. 1982. Public Sector/Private Sector Interaction in Providing Information Services. Washington, DC: NCLIS; February 1982. (Cited in ref.3)

6. U.S. Congress. 96th Congress, 2nd Session. 1980. Paperwork Reduction Act of 1980: Public Law 96-511, 96th Congress, 2nd Session. Statutes at Large. 1980; 94: 2812. Washington, DC: Government Printing Office; 1980. (Cited in ref.3)

7. U.S. Office of Management and Budget (OMB). 1982. Improving Government Information Resources Management. Washington, DC: OMB; 1982 March. (Cited in ref.3)

8. U.S. Office of Management and Budget (OMB). Office of Federal Procurement Policy. 1982. Draft: Proposed Revisions to OMB Circular A-76. Washington, DC: OMB; 198[illegible]. (Cited in ref. 3)

9. Joseph W. Duncan, John C. Beresford, Robert L. Chartrand, Melvin S. Day, and Joseph E. Kasputys. (1980) Private Versus Public Sector Responsibility for the Collection, Distribution, and Analysis of Statistical Data. Review of Public Data Use (Quarterly) 1980, 307-325.

10. Holden, Constance (1981) Library of Medicine versus Private Enterprise. Science, 212, 5 June 1981, 1125-1126.

11. Competition between private sector and government in developing data bases. Information Hotline, 13 (4), April 1983.

12. Galinski, C. (1982) Information and documentation in science and technology in Japan. Journal of Information Science, 5 (2/3), November 1982, 63-77.

13. Commission of the European Communities (1979). European society faced with the challenge of new information technologies: a Community response (The "d'Avignon Report"). COM(79) 650 final. Brussels, 26 November 1979.

14. Maxwell, Robert (1982) Data retrieval systems and international publishing. Aslib Proceedings, 34(1), January 1982, 38-45.

15. Commission of the European Communities (CEC). (1983) Euronet DIANE: 3 years progress. Euronet DIANE News, No.30, Feb/March-1983.

16. Gibbins, Patrick C. (1982) A plea for fair competition in the European Information Industry. (In ref.6, 21-26).

17. Collier, Harry E; Bilboul, Roger E. (1982) Electronic and Database Publishing: the need to re-define public and private roles. (In ref. 6, 13-19).

18. C.E.C. (1979) Communication from the Commission regarding the promotion of information systems of value to the Community as a whole. CALL FOR PROPOSALS. Official Journal of the European Communities, C298, 22, 29 November 1979.

19. C.E.C. (1982) New call interest. Euronet DIANE News, No.29, December 1982.

20. Commission of the European Communities, Directorate General XII (1980)) ARTEMIS: A system for document digitalisation and telctransmission. Report by Arthur D. Little, April, 1980. (Obtainable from Learned Information Ltd., Besselsleigh Rd, Abingdon, Oxford OX13 6LG, UK) (Price £29).

21. C.E.C. (1982) ADONIS to continue (In ref.19, p.6)
But also:
Six, Five, Four, Three... Adonis fades away. Monitor, No.25, March 1983.

22. C.E.C. (1980) SYSTRAN for Euronet. Euronet DIANE News, No.20, August/September 1980.

23. C.E.C. (1982) Accord sur la traduction automatique. (In ref.19, p.1) (See also ref. 38, 94-95).

24. Commission of The European Communities. (1980) Videotex. Report on a workshop on videotex in agriculture held in Luxembourg on 28th February 1980. April 1980, PACTEL, 33 Greycoat Street, London SW1P 2QF.

25. Osborn, John. (1982) The UK situation. Aslib Proceedings, 34(1), January 1982, 1-12.

26. Canisius, P. (1982) Information policies in Western Europe - some remarks about the present situation. Aslib Proceedings, 34(1), 13-24.

27. Boca, B. (1982) French governmental activities relating to the supply of information. (In ref. 4, 30-34).

28. Morin, M. (1980) Private communication.

29. The Programme of the Federal German Republic for the Promotion of Information and Documentation (I & D-Programme) 1974-77. Translation by Alice and Herbert Coblans, published by the Institute of Documentation (IDW, now the GID) on behalf of the Federal Minister for Science and Technology, Frankfurt-on-Main, 1976.

30. Henrichs, N. (1982) Information policy in the Federal Republic of Germany. (In ref 4, 27-30)

31. Schotteldreier, F. (1982) Commercial information providers seek broadcasting outlets (In ref.4, 40-45)

32. Krog, N (1980) Presentation in Oslo to F.I.D. tour of Scandinavia, September 1980. (For details, contact author)

33. Anderson, June M. (1983). The role of the private sector in Australian information industry. Australian Library Journal, 32(1), February 1983. 15-23.

34. Klingender, Tony. (1981) National information policy: the role of the information industry. In Papers presented at the National Information Policy Seminar, Canberra, 7-8 December 1981, 26-30. Library Association of Australia, 1981.

35. Judge, Peter J. (1981) Dependence, interdependance and independance, the role of Government in the development of information services. In Papers presented at the National Information Policy Seminar, Canberra, 7-8 December 1981, 90-106. Library Association of Australia, 1981.

36. Butler, Steve (Torrens Industries, Canberra; and Convenor of Canberra "High Technology Group") (1983) Private communication.

37. Australian Database Development Association (1983). Contact: Hon.Secretary, Gerard Peguero, Footscray Institute of Technology.

38. Judge, Peter J. (1981). Information retrieval in Australia. In Proceedings of the VALA National Conference on Library Automation: "Meeting the challenge of technology". Melbourne, 16-18 November 1981, 88-101. B.J. Cheney, Ed. Victorian Association for Library Automation, G.P.O. Box 2342V, Melbourne, Victoria 3001.

39. Quoted in Campbell, H.C. (1979) Developing world wide interaction with Euronet. International Library Review, 11, 193-197 (1979).

40. Etzioni, Amitai (1973). The third sector and domestic missions. Public Administration Review, 33(4), July/August 1973. (Cited in ref.2)

41. Chartrand, Robert L (1982) The role of government in the information society. Journal of Information Science, 5(4), December 1982, 137-143.

42. Zwillenberg, Hans J. Private communication, 21 July 1983.

43. Killen, Diana (1983). Information retrieval - the present future. The Australian Library Journal, 32(2) May 1983, 47-55.

44. Jones, Barry O (1981) Information, librarians and technology in a changing world. Paper to the NLA/NZLA Conference, Christchurch 20 January 1981.

45. Jones, Barry O (1982) Information society and Australia. The Meredith Memorial Lectures, 1982. La Trobe University, 11 October 1982.

46. Jones, Barry O (1982) Sleepers Wake! Technology and the future of work. OUP

47. Australian Labor Party (1982) Platform, Constitution and Rules as approved by the 35th National Conference, Canberra, 1982.

48. Judge, Peter J (1983) Australian databases. An Australian contribution to the Asian Regional Seminar/Workshop on local databases and their use, UNESCO, Manila, 10-14 October 1983.

49. Monitor, 33, November 1983. Political storm brews over INKA-CAS link.

Appendix I

Recommendations of the US National Commission on Libraries and Information Science (NCLIS) Task Force on "Public Sector/Private Sector interaction in providing information sevices"

The 25 recommendations (out of 27) on which the 16 members of the NCLIS Task Force were almost unanimous may be summarised briefly (a few have been merged) as:

- provide an environment to enhance competition in information services;
- apply the First Amendment to information services (this concerns freedom of information issues);
- encourage Congress to be consistent in legislation affecting such services;
- encourage Government agencies to use efficient technologies;
- encourage voluntary standards;
- encourage education and research in library and information science;
- encourage statistical programs in information fields;
- assess the economic impact of Federal information activities;
- identify and evaluate alternatives to Federal information activities;
- develop libraries for public access to governmental information;
- eliminate legal barriers to new information services;
- encourage private enterprise to "add value" to government information by re-packaging and marketing it;
- encourage eg libraries and bookstores to disseminate government information;
- involve the private sector in national information planning;
- ensure that government information activity matches policies and goals;
- give sufficient warning of new government information actions so that the private sector can become involved;
- submit such actions to outside review before implementation;
- periodically review government information, activities to see whether they should continue;
- announce the availability of government information and maintain registers of it;
- deposit government information where it may be examined at no charge;
- waive copyright for domestic use of Federal information;
- expand existing libraries and information centres to distribute government information, rather than create new ones.

The two recommendations on which there was a split vote are discussed in the text on page 9.

Appendix 2

Statement on National Information Policy, taken from the Australian Labor Party Platform, Constitution and Rules as approved by the 35th National Conference, Canberra, 1982.

L NATIONAL INFORMATION POLICY

Recognising that in an era of rapid technological change access to information is a precondition to national or personal autonomy, the Australian Labor Party adopts the following National Information Policy -

57 All Australians are entitled to free access to information and library services of acceptable standard, regardless of where they live, of their social and economic position, language, sex, age, mobility or physical disabilities.

58 The effective working of democracy depends on the availability of adequate information and the capacity for its independent evaluation.

The right to know, to be informed, is basic to every person. In our society access to information is a vital resource of government and of the public, and should not be concentrated in the hands of the rich.

59 The Australian community is divided between the 'information rich' and the 'information poor'. Information facilities are remote from those who need them most. They do not know what is available and do not know how to remedy their lack of information.

60 Growing inequity in 'information transfer' threatens the position of individuals relative to governments and corporations. Increasing volume of available information due to new methods of gathering, storing and disseminating may lead to -

a increasing tendency towards specialisation and the fragmentation of knowledge;

b a growing sense of 'alienation' and 'anomie' in many people who feel unable to understand what is going on around them;

c a risk that power will move towards technocrats and away from representative institutions; and

d a major threat to privacy from personal data files in private hands.

61 Information problems should not continue to be treated in the narrow perspective of science and technology, and left to scientists and experts alone, but should be considered in the broader context of knowledge and social welfare in which information is a fundamental resource.

62 Governments must plan for the new technologies and ensure that information systems are not developed in a chaotic fashion for exclusively commercial reasons.

63 Legislation should define and codify -

a the right of access, where this is in the public interest, of individuals or public or private bodies to relevant non-government information resources;

b the political and social guarantees which individuals and institutions can legitimately expect, including protection of privacy and professional secrecy;

c the basic rules of reciprocity which should govern relationships between public and private systems and networks; and

d a code of ethics for professions and industries concerned in this field.

64 The provision of public library and information services should remain the collective responsibility of the Commonwealth, state, territory and local levels of government, funded in part by each.

65 Public libraries must become information resource centres, including local data banks, information about access to government services, with greater emphasis on non-book material such as gramophone records, tapes, cassettes, microforms and audio-visual material generally.

66 The expansion and extension of all library and information services should be achieved through co-operation and/or contract and the formation of library systems and networks with each service retaining its autonomy within the overall state plan for the development of these services. Already existing information services should be co-ordinated and integrated to avoid duplication and waste of resources.

AUSTRALIAN TELECOMMUNICATIONS SERVICES

by

J.A. DAVIDSON AO, B Eng(Hons), FIE Aust.

CHAIRMAN OF THE COMMITTEE OF INQUIRY INTO
TELECOMMUNICATIONS SERVICES IN AUSTRALIA

46 Kippax Street, Surry Hills, NSW
Telephone No: 217 0840

Abstract

A discussion of some of the basic findings of the "Davidson" Committee.

A summary of the reasons for recommending separation of the provision of services from the operation of the network.

A comparison of leased and independent networks and the impact of the domestic satellite and cable television on the supply of information services.

AUSTRALIAN TELECOMMUNICATIONS SERVICES

SYSTEMS AND SERVICE

The present legislation provides that Telecom has a monopoly of the telephone network, all terminal equipment, and services that use the telephone network. Telecom recognises the need for the private sector in the terminal equipment and services area and allows restricted access for the private sector by their policy of "permitted attachments".

However, such access is solely at Telecom's discretion and can be varied or withdrawn as Telecom considers appropriate. The private sector has no legal or permanent rights in this field.

There are a number of specialised services that could be provided for groups such as libraries, doctors, lawyers, bankers, farmers etc. the operation of which require highly specialised knowledge and prompt response to customer preferences. It is important that such customers should have a choice of services and by their selective patronage the better services will be encouraged. Innovation and service are both stimulated when there is competition and the success or failure of the service rests on its performance as judged by the customers.

If Telecom was to provide such services in competition with private enterprise, whilst at the same time controlling the telephone network system, there would be the risk that Telecom could adopt predatory practices against those competing with it in the services market which would endanger the survival of independent services. Already there are problems with private paging systems which compete with Telecom's "Telefinder" service.

The Davidson Committee recommended that Telecom be responsible for its national telephone network "system" but not the "services" that use the system.

NOTE: The numbers in brackets refer to the paragraphs of the "Report of the Committee of Inquiry into Telecommunications Services in Australia".

A telecommunications network can be likened to a network of roads and intersections. The nation uses the road system to carry goods and people from place to place. It uses the telephone network system to carry messages from place to place. Anyone can own and operate a vehicle and provide a "service" by the carriage of goods on the roads provided the vehicle conforms to published national standards and operates in accordance with the traffic regulations. Similarly the Committee recommended that the public should have the right to use the telephone network system to provide the service of their choice provided their equipment and their mode of operation conformed to published national standards (R22).

The Committee endorsed the public benefit of a single national telephone network i.e. the "system" for which Telecom would be responsible (2.69) (2.75). The system would terminate at the boundary of the customer's premises (R24, R25). The telephone customer would be responsible for getting a licensed "teletrician" (R23) to install or alter wiring and equipment within his premises in a similar way to which he gets a licensed "electrician" to install or alter electrical wiring and connect to the electricity supply "system".

There are at present some 28 telephone networks operating independently of Telecom which are owned by railways, electricity distribution authorities, pipeline authorities, Defence Department etc. It is clearly in the national interest to provide legislation for these to continue.

This is the reason for the Committee's recommendation (R4) "That independent networks should be permitted subject to ministerial authorization".

It is unfortunate that this recommendation has been used out of context to infer that the Committee intended to fragment the existing public switched telephone network.

Whether or not the legislation provided for ministerial authorisation of independent networks, there is always the right of a minister of state to introduce legislation for a specific purpose which would achieve the same purpose but in a less orderly fashion.

All of Telecom's resources both human and financial should be directed to the development and operation of the national telecommunications network which by its nature requires long term planning and financing to develop a balanced integrated system.

The Committee recommended that the national telecommunications network operator (Telecom) should not operate in the terminal services field, so that competitors in this market would have fair competition.

To protect the employment of those of Telecom's employees currently engaged in customer services, the Committee recommended that they be transferred to a new corporation "Telequip" (3.51 to 3.54) completely separate from Telecom.

These proposals would protect Telecom's profit which comes principally from "call revenue". Telecom does not make a profit from the customer services if the normal trading overheads involved in such services are included in the service. At the present time such trading overheads are shared with the network. The Committee recommended selling-off the "loss bits" of Telecom and not the "profitable bits".

Suggestions have been made that services could be separated into classes such as "basic" and "enhanced" or "value-added" rather than separating all services from the system. Any arrangement which requires the differentiation by class of traffic or type of service will be administratively complicated and in the longer term unworkable due to changing technology.

INDEPENDENT NETWORKS

First let us distinguish between -

(a) a leased network when a portion of the network (lines) is leased from the network operator for the exclusive use of the lessee,

and

(b) an independent network in which the network is owned and operated by a third party independent of the public switched telephone network.

The leased network by virtue of its exclusive dedication to the lessee is, for communication purposes, independent from the rest of the public switched network.

The leased network can provide the same communication facilities as the independent network with the possibility of easier interconnection with the public switched telephone network.

In most instances the leased network will require an investment substantially less than an independent network because it is an increment of a large system.

Why then has there been interest in the establishment of independent networks?

Firstly, because Telecom generally prohibits the resale of leased capacity, restricts the attachment of terminal equipment and excludes interconnection with the public switched telephone network (2.8).

As long as Telecom prohibits the resale of leased capacity, entrepreneurs must look to independent networks as the only way of achieving the flexibility in operation they require.

Resale of leased capacity offers a number of benefits (2.20):-

(a) Improves utilisation of the network.

(b) Enhances customer economics and convenience.

(c) Increases the market value of leased lines with opportunities of increased revenue to Telecom.

(d) Encourages innovative services.

(e) Results in a fairer price structure.

There would be some diversion of traffic from Telecom's public switched telephone network to the leased networks but this should not result in a significant loss of revenue to Telecom because the market value of the leased networks will increase to offset it (2.27).

Secondly, because the present public switched telephone network does not have the capacity to meet some of the requirements of cable television and radiated television.

A television transmission requires a channel capacity equivalent to some 2,000 voice channels.

The installation of cables or satellite for television offers the opportunity to provide large increases in voice and data capacity at a small incremental cost on top of that required for the transmission of television.

One might be forgiven for assuming that as a result, the day of the information and videographic services at a price that the average user could afford was in sight.

This may be the case in some places, but in Australia television services have been paying well below commercial rates (6.54). If this practice continues with cable television and the satellite, then very expensive rates will be required for voice and data to subsidize television transmission.

There is an urgent need for an assessment of the relevant value to the community of the various types of telecommunications services ranging from voice to television and to establish policies so as to ensure that services of high priority are not unduly restricted because they bear a disproportionate amount of the cost.

Is it in the communities interest to charge a library the equivalent of fifteen times as much as a television station for a leased line between Sydney and Melbourne?

SATELLITE

The Australian domestic satellite is on order and is expected to be in operation in 1985 together with eight or ten earth stations.

The satellite and earth stations will be owned by Aussat which is a public company at present wholly owned by the Commonwealth Government.

The whole lot in 1982 could cost from 225 to 300 million dollars. The Committee estimated the cost of operating it, including 15% interest on this investment, to be between 62 and 86 million dollars per year.

The main users of the fifteen transponder satellite have been assessed as (V2 Pa 90).

ABC/SBS television programme relay and broadcasting	- 50%
Commercial television	- 20%
Dept. of Transport Air Traffic Control	- 15%
Others including commercial telecommunications	- 15%

If Aussat adopts a similar price structure to Telecom for leased capacity, one transponder carrying commercial traffic could produce a revenue in excess of the twelve transponders that might be used for television. There is clearly a strong financial incentive for Aussat to seek commercial traffic.

However, Telecom's ability to continue to subsidize remote subscribers will be reduced if Aussat obtains substantial amounts of inter-city commercial telecommunications traffic.

The establishment of Aussat raises a number of questions, the answers to which will have a profound effect on the future of telecommunications in Australia.

Can Aussat adopt a pricing structure similar to Telecom's without contravening its Memorandum of Association which prohibits discriminatory pricing?

If Telecom does not lower its trunk route prices how does it retain its inter-city trunk traffic?

If Telecom does lower its prices how does it maintain its current level of subsidy to remote subscribers?

Will major users be permitted to install their own earth stations to access the satellite direct?

If major users have to access the satellite through an Aussat earth station how will they transmit to the earth station?

If Aussat has its own terrestrial network to carry traffic to its earth stations whilst having a monopoly in the space segment would this enable Aussat to arrange its prices so as to ensure through traffic used, the Aussat terrestrial network instead of Telecom's?

If Aussat is not allowed to own its own terrestrial network and is required to use Telecom's, will this enable Telecom to price the terrestrial connections at a rate such as to make the satellite link commercially unattractive?

CABLE TELEVISION

I have briefly mentioned that cables used for television whether optical fibres or coaxial could provide, at very little extra cost, substantial capacity for information and other specialized services such as burglar and fire alarms etc.

The Australian Broadcasting Tribunal (Aug. 1982) reported on the development of cable television (2.63).

The Australian Broadcasting Tribunal recommended that any cable distribution system for subscription television should provide capacity for general telecommunications services. We agree with this recommendation.

The Australian Broadcasting Tribunal recommended that franchises be granted which provided an exclusive right to provide subscription cable television in a region. The Committee considered that this was undesirable.

If the distribution system is owned by the television programme provider it would be difficult to ensure that fair access was provided for other telecommunications services and/or competitive services.

How can you prevent the franchise owner from subsidizing his services from the sale of his surplus capacity?

The Committee considered that it would be preferable to separate the "system" from the "service" as discussed in the early part of this paper.

Either Telecom or some other company independent of the programme provider should provide the cable distribution system and supply capacity to, the franchise television programme provider, other services, and information providers.

I was asked to indicate the future directions of telecommunications and information handling.

I fear that I have posed more questions than answers. No one can tell where Australia will head or what the opportunities are until the Government answers some of these questions.

With cable television and satellites just over the horizon (so to speak) the time has come to establish the rules for Australia's future telecommunications.

We have the opportunity NOW either to develop in an orderly fashion with benefits for all, or to stagger from one crisis to the next.

The first step is to form a National Telecommunications Advisory Council (12.34) comprising representatives from the various community interests.

Such a council would be responsible for advising the Minister on matters relevant to telecommunications planning and development in Australia.

J. Davidson
4.7.1983

PUBLIC INFORMATION SYSTEMS IN AUSTRALIA

Roger Allen, Managing Director,
Computer Power Group Pty. Ltd.

I want to talk today about two significant case studies in which my company is involved, which concern information retrieval systems that are being set up on a national basis. These two are the national computerized legal information retrieval system, and the videotex system for which Telecom is currently out to tender.

I found Peter Judge's paper, which gave a wide-ranging and international perspective to the debate between the public and private sector, to be very interesting. When one thinks about how it applies to Australia, we find that there are indeed a number of quite complex issues to grapple with. Mr Davidson has talked about some of the issues which I would see as the lower level of the whole information business, that is the infrastructures, the communications aspects and whether they should be in the public sector, or partly public and partly private. What I want to talk about is the next layer up, if you like, where you start to look at value-added services, and I'm going to talk about computers and databases and the like.

I want to endorse Peter Judge's remarks about the necessity for increased communication between the two sectors. I know, being in the private sector, one is sometimes at the mercy of decisions that are made, and one often doesn't have an opportunity to put one's views forth, and that can be disconcerting. Tony Klingender's point is that you can often be spending multi-million dollars in establishing systems which can be destroyed by political or bureaucratic decision-making. I think in fact that currently, probably because of the change in government, we do have an increased dialogue going on, and I'm quite heartened by some of the discussions we've been having generally in the industry.

Legal information systems.

Let's look now at legal information retrieval systems. There has been a long debate on who should operate these systems. It all started about 10 years ago with a special Standing Committee of Attorneys-General. One of the dilemmas here was 'Should it be in the public or private sector'? Also the law had a number of aspects, both State and Federal. So , the next question was 'Is it going to be a State-based or Federal-based issue?'. In fact that took many years of debate to work out. As you are all well aware in this country there are many rivalries between States, and between States and the Commonwealth. This is a major problem when we talk about national systems. The raw information has to come from both the States and the Federal.

With legal systems overseas we have a mixture of public and private sector involvement. In Europe there are lots of systems being set up by governments and the public sector. In the U.S. and the U.K. there are private systems operating, so there are various models we can look at overseas. In the end a quite interesting model was decided upon, and that was to hand the development and operation of this system over to the private sector, but with some government control and regulation. If you like it was a 'joint venture' between the public and the private sector.

The Commonwealth and the States decided to use their Crown copyright as a method of preventing people, other than the authorized operator, from setting up competing services. Now that decision has caused a lot of comment and debate, with a lot of people saying it should be thrown open to open competition. The reason they decided that an exclusive licence was necessary was essentially: one, because of the size of the market-place in Australia, and two, the control of the database. I support the view that there is room for only one database. (The database, by the way, contains all the legislative material of all the States and the Commonwealth as well as the case law of the upper courts.) Obviously it was essential that this database be very, very accurate and that the quality of the service was very high - one is talking about the laws of the country. And therefore, the Government must have qualitative control over this database. The other thing that was necessary was to set up very strong links with the courts and the Government printing office and Parliament, where the information in fact originates. It is very hard in a competitive situation for governments to set up these very strong administrative links between the public and the private sector. Without those links then the databases don't have the currency that you need or the accuracy.

Another important issue is the user's point of view. I think the last thing a lawyer would want would be having to have two or three different types of terminals on his desk, or even in a library, to gain access to a full range of databases. It is very desirable to have one terminal to get at all the databases. Now, OK, if you access things through a packet-switching network you can have a common type of terminal, but this is not very user-orientated. For instance in America with the LEXIS system they use a particular dedicated type of terminal. In one scenario in the U.K. you need one terminal for one vendor, and you can only access the data provided by that vendor, and another, incompatible terminal to access another database. That's a problem. I was approached the other day by some people in the finance industry who currently subscribe to six separate services in Australia for finance information, and they need about four different types of terminals. And with the the prospect of videotex coming that means yet another different type of terminal. Clearly, it's ridiculous. Even if one had the one terminal - and it's probably going to drop down to a common denominator , which means you have a fairly unintelligent type of terminal - you have to learn different search strategies and familiarities and the like. Again, that is a problem. So from the user's point of view he really would like to see the one company offering the one standard, consistent interface and yet be able to get at a range of databases. When you think of that and the size of the Australian market - we've only got 15 million people - and you look at that against the background of the cost of establishing a system like this, estimated at over $5 million, it's not hard to see why the exclusive licence makes a lot of sense. One point that Peter [Judge] mentioned in reference to Tony Klingender's paper was that the government should have no control over these databases - I wouldn't quite agree with that. I don't think you can grant an exclusive licence without some public accountability.

Key components in public information systems are the marketing, the level of service, the training and the support, and the quality of the database. These really determine whether or not the system is successful. And one has to offer a lot of complementary services outside of the raw data that might come from the government. So there's clearly a role for the private sector. It's a bit hard to think of the government taking that sort of entrepreneurial and aggressive marketing stance and providing the proper range and quality of

service which is the hallmark of a successful system.

Similarly we plan to link into other government systems such as title offices, which are being established in all states of Australia, and systems known as justice information systems, like the one already established over in W.A. Again, we want to be able to link these computers together to provide that one common interface. I think that's probably enough on the legal front.

Videotex.

Videotex is a very interesting case study - it contains a bit of everything. Up until two years ago Telecom had plans to launch a national videotex system, with Telecom providing some of these value-added services. In addition to network itself they were going to provide an information framework on the database. It was going to own the infrastructure on which the information-providers could put their information, which is the model that operates in the U.K.

As a result of intensive lobbying - and it's no secret there was a lot of lobbying, particularly from Packer and Myer - that it was inappropriate that Telecom should operate in this manner, and that it should be left to private enterprise to establish. As a result, the Telecom submission to the Minister was knocked back, and it was left to the private sector. Almost two years to the day Telecom is back in it, and have just issued a tender with the view of implementing a system as I've just described, before the end of next year. (I was reminded the other day that two years is about the gestation period of an elephant - perhaps it's significant.) The answer to the question 'What happened in the two years?' is 'Really, not a lot'.

We are still beset by a multiplicity of standards. It's absolutely crazy in a country of 15 million people to currently have four competing standards of videotex, so the scenario is that you could have, without some form of government intervention, up to four different types of system, which means if you buy one terminal you can only access the data on the system that conforms to that vendor's standard. Imagine having four of these standards. From a consumer's point of view I think that's totally inconvenient. From a businessman's point of view it's also crazy in a marketplace as small as Australia. So this is the sort of thing that does happen in a completely open-market situation. Even in the U.S. where they don't have this government regulation, they've only got one standard. Basically a de facto standard set up by AT&T has emerged and the whole of North America has gone that way. So now they're operating with one standard, where Australia's using four competing standards. So, clearly videotex, I believe, will never get off the ground properly in Australia, other than in small, closed user-group systems, without some intervention by Telecom. Now how far this intervention should go I think is a good question. By putting up the national communications network which supports particular standards of practice, or merging those different standards together, then they would certainly be doing a great service to the public in enforcing standards, so that people wanting to put up databases or wanting to set up privately would be doing so to a standard such that everyone would be able to then buy one terminal to be able to access all databases. Providing the switching mechanism from Telecom across into a whole range of private systems is quite a reasonable model, I believe, between private enterprise and the public. This is basically the proposed case. There is still a lot of argument as to

which one of these four standards we should choose, so obviously not everyone is going to be happy. Perhaps we could start with one standard, and move from a multi-standard in an integrated fashion. With Telecom providing the framework for gatewaying these systems, the way is clear for a major step forward in providing information services in this country. Relatively small organizations can put up information onto videotex. The mechanisms will be there for the larger companies to put in their own systems - they can link these into Telecom. Smaller publishers of information can put it up on Telecom or on other private databases. The bill will go on through Telecom accounts, which is very effective way of collecting money, and is a major service to information providers.

Unbottling the genie

by
Ian Reinecke

I want to talk to you about a subject I've been devoting some attention to for the past two years, and that's the concept of information as a product.

I was recently in Washington, and before that in New York, and I went to see my publishers (who are actually publishing a version of my 'Micro Invaders' internationally). I hope it will be as big a success story for Penguin in the States, as a book published in the last few months 'Information USA' [1], which despite its bulk is $19.95. It is by man called Matthew Lesko. Penguin have told me they sold 100,000 copies of this book in the past two months. I am interested in Lesko because I'm interested in this area of information.

One of the things that Lesko has done in this book is terrific - he's actually gone to government sources of information, and compiled this massive paperback (but it's still reasonably acceptable). It contains a great deal of information about how the ordinary citizen or consumer can go about searching for information. And, I'm sure it's going to remain a best-seller for some years to come.

But I'll just read you a couple of entries - some of it is entertaining, some of it is absolutely serious. He has a sample section at the front entitled 'How to find a free expert and free information on anything', and he says:

> Washington is the largest source of free information and expertise in the world, and most of it goes to waste. The Federal Government purports to have 500,000 subject experts that spend billions of dollars a year on specialized studies, of which few people take advantage. For any problem that you may face, either professionally or personally, there is likely to be a free expert on the Federal payroll who has spent years studying the very same subject. These specialists can save you countless hours of research and many dollars in consulting fees. [2]

Some of the information he comes up with is quite delightful. He begins with the "best of Government freebies - information you didn't know". One of the Government freebies in the U.S. is called 'Adopt-a-horse', and this is the description:

> In order to control the population of wild horses and burros grazing on public land, the U.S. Department of the Interior offers these animals for adoption, to qualified applicants. For further information and adoption applications contact 'Adopt-a-horse', P.O. 25047, Denver, Colorado. [3]

One of the other Government freebies I really like is:

> Celebrate a special day by flying your flag over the Capitol. This may not be free but for the money it's priceless. For the cost of a flag ($5.50 to $16) your Congressman can have the architect of the Capitol fly your personal Stars and Stripes over the Capitol building on the day you specify. This makes an unusual birthday gift because you then receive the flag and a certificate noting the date the flag is flown and for whom. [4]

Now for the general discussion about the attitudes to information. I read a very good book by Jeremy Seabrook, the English writer who published a year or so ago, simply called 'Unemployment' [5], and he tells a wonderful story of the '30s, of a couple of families in England surviving very well in the Depression years, by discovering a secret mine that nobody else had discovered. It's in the middle of a wheatfield, so in the middle of the night these guys go out with sacks, and they work away 12 hours right through the night, and they come back with the coal, and they survive the Depression for three or four years, on the basis of having a secret mine.

It seems to me that much of the attitude by information marketers involves looking at Government information, information collected at public expense, as a secret mine. I want to develop that.

Peter Judge, quoted a couple of people who, it seems to me, reflect this idea very well. First of all, on page PJ05 [ed.], the National Commission on Libraries and Information Science (NCLIS) reports in 1982, concerning Government:
"The government should not provide information services commercially unless there are compelling reasons, and the private sector is protected."
In the U.K., on page PJ12 [ed.] of Peter Judge's paper, again a quote from an article by Collier and Bilboul: "Government is needed as an example, as a source of raw information and as an encourager of the private sector: it is not needed as an inefficient, subsidised competitor nor as an undynamic monopoly service supplier."

And that seems to me to be interesting - because there's the assumption there that information collected at Government expense is a secret mine to be mined by those with the password. And the most vociferous exponents of the view that they ought to be gatekeepers of this secret mine are in fact in the private sector.

The first time that I saw the idea of information as a product was in a series of corporate ads, at the beginning of 1978. They conveyed it by having in one hand a lump of coal, and in the other a silicon chip, and it spoke very cleverly about information, i.e. what flows through the silicon chip, and its source, just like coal, just like the secret mine. And it was a very successful campaign. (I understand the man who invented it is now president of a subsidiary of Needham, Harper, Steems which is ITT's corporate advertising agency, and he is the president of this new subsidiary which has the wonderful title of 'Issues and Images Inc.'. He's done very well.)

The idea of information as a product to be marketed in a consumer society is one that's adopted not only by the private sector, but by many people here involved in information in the public sector. I think they've accepted it clearly, sometimes with very little challenge. I don't want to mis-describe

the position of the information marketers in the private sector, so I'll quote from one of the best known in the world, a man called Paul Zurkowski, who is the President (and has been for the past 16 years or so) of the U.S. Information Industry Association. That's an organization that Peter Judge referred to in his talk. And one of the papers he delivered is called "Integrating America's Infostructure" [6]. It's not my language, I'm just quoting. He makes 8 points about information companies and their products, in the process of developing his theme of integrating America's infostructure :

(1) "The first feature of an information company is that it creates its own product" - (which discriminates information providers and marketers from book publishers who generally don't provide their own product, it's provided by the authors. And quite often once information companies have created their own product they retain a hold over its added value by attaching copyright to it.)
(2) "An information company maintains close end-user relations". (The fact that we don't find this language peculiar I think is really instructive). "To maintain close end-user relations those companies are expected to translate user needs into product enhancements and new product ideas." (He's still talking about information, he's not talking about soap powder.)
(3) "Information products are customized and delivered in cusom packaging".
(4) "Information companies are media-independent. Often these needs can better be satisfied in a media other than the media in which the product was first offered."
(5) "Information products are decision-directed. Information is like the proverbial quarter-inch drill bit. Millions are sold each year, not to people who want drill bits, but to people who want holes".
(6) "Information companies price on the basis of benefit provided" (and the assessment of these benefits is interesting it seems to me) "on what it would cost the end-user to reproduce the product, rather than on a pro-rata share of producing the information". (So the benefits to the end user are assessed by the supplier.)
(7) "Information companies serve as repositories" (and literally anything goes - Zurkowski uses the phrase) "of what's known or knowable" (which seems to encompass everything.)
(8) "Information companies perceive their product as [illegible]ng information".

So that's really from, I guess, one of the better-known exponents of the view that information is a product to be mined, and that's his 1983 conference circuit speech.

One of the concerns however that Zurkowski warns the American Association against (and here is a new word, it's new to me and I've spent some years reporting the computer industry and new words are actually quite difficult to come across) - what Zurkowski is warning his members against is something he calls "consumer disintermediation". (I have to be very careful here because

Paul Hawken, an American author, has written a book called 'The Next Economy' - I haven't seen it yet, but it looks very interesting). Disintermediation is taking out the intermediary role, or that's how it translates; I translate it as taking out the middle-man, but that's probably far too brutal a description of it. Zurkowski talks about the danger to information companies of disintermediation particularly in transaction-based activities. Things like teleshopping, telebanking, electronic directories for telephone numbers (as they have in France) and interactive video functions of which Roger Allen talked about, for example booking travel. And Zurkowski's warning is couched in these terms:

> Stand-alone enterprises run the risk of disintermediation and even elimination. New opportunities are built into the integration of the infostructure.

And we've identified the greatest threat really to information companies; the greatest threat indeed may not be government regulation, may not be standards, but the greatest threat could be disintermediation. And the reason why it is a threat, it seems to me, is because the concept of disintermediation - taking out the middle-man - threatens the very reason for existence of the information utilities and companies.

Information as product is something that I've attempted to grapple with in 'Micro Invaders' (which was published last year [8]). And at the end of Peter Judge's paper [PJ19, ed.] he made a couple of suggestions for the sorts of organizations that might be set up to disseminate information, and one he described I guess is reasonably close to the suggestion that I picked up in 'Micro Invaders', that is a public non-governmental establishment. The idea really would be to push against the idea of information as a product.

Let me give you one quote. It's by Masuda this suggestion, and Masuda is terrifically well-known as a writer in the area of information and society, and he defines in a paper that he wrote in the late '70s, the concept of an information utility, which seems to me may not treat information as a product. He says:

> An information utility is an information superstructure consisting of public information-processing service facilities that combine computer and communications networks. From these facilities anyone, anywhere, at any time can easily, quickly and inexpensively obtain the information he or she needs....An information utility is not simply used by a limited group of users, but is widely used in the public interest by people in general and, moreover, the general public itself operates the information utility service. [9]

Contained in that definition of the information utility are the seeds of recognition that information and the means by which it is collected, stored and spread is matter of public policy. It is too important a matter to leave to the already highly-concentrated sources from which we derive much of our information. The public has a right to know, and to use information which is being made more manageable by electronic technology.

Let me quote from Micro Invaders to illustrate the point:

> There is a new literacy at stake. The ability to come to grips with the information warehouse that computers provide. The alternative is to admit to the cornucopia only those with the capacity to pay for the privilege. The Japanese approach at least recognizes that, left to its own devices, neither the market forces of information providers, particularly established publishers, nor the technology itself, preserves public access to information. [10]

That was written a couple of years ago and I've attempted to develop that since.

It seems to me that when you look at pre-conditions for such an information utility, or even in a less formal sense of something that challenges the view of information as a product, we need at least two pre-conditions. (I'm not suggesting these are exclusive, there are many more). First of all we need a technological infrastructure to match much of the importance of Telecom remaining viable in the public sector, which is something that is canvassed in 'The Phone Book' [11]. I was recently in France, and even more I was convinced that those public communications-type facilities belong in an area where they can be controlled by the society that pays for them. And in France, for example, on TRANSPAC the packet-switched network, by 1987 the TRANSPAC people expect 25% of their traffic to be videotext. The flow of information is really extraordinary there.

The second pre-condition is the perception of information less as a product than, if you like, a resource, especially if it is collected at public expense. So the fear of disintermediation is real by the information marketers, because much of the packaging they do is cosmetic. And that's why it's possible for a book like 'Information USA' to be published in the States. The fact is, information is available and that much of what information providers are doing could be done by the people that Zurkowski calls the end-users.

Taking a leaf from Lesko, it seems to me that if we encourage citizens and individuals to search out information themselves, then what we would be encouraging is, firstly a more dynamic and enquiring society. (I won't argue for that - I'll just say that very soon we'll need a more dynamic and enquiring society) and, secondly, that we disperse power away from the packagers of information.

Let's go back to Lesko. Not all of his information is trivial. In his table of contents he lists these items:

- consumer complaints;
- Government benefits;
- finding your roots;
- free help and information for buying and maintaining an automobile;
- free help and information for financing, buying, renting or remodelling an apartment, condominium or house;
- help with your health;
- educational reading information;
- free help and expertise on having a baby and raising a child;

and so on. [12]

There is, it seems to me, an enormous amount of information collected at public expense which is not made accessible to the ordinary citizen, and yet in a way, it is vital for the continued existence and the health of democratic societies. And one of these problems is how to deal with the bureaucracy. That's one area which is so important, particularly in terms of providing information. So many people don't have the time, do they, or they don't have the expertise. The time it seems to me will actually solve itself as those working weeks contract over the next two, three, four decades. But what is really needed is some sort of intermediation, to assist ordinary citizens to get to, and manage, information which is there and has been collected at public expense.

There is a much broader role for people who describe themselves as information scientists, as facilitators of that process. The aim would be, rather than to create a society of passive consumers of information - the way in which we buy breakfast cereal - that you could envisage a society where the citizens demand the kinds of information which are relevant. And I don't think that this ties them to the technology and dependence on screens and keyboards. And I apologize for saying that at a Conference which has 'automation' in its title. A screen and keyboard are very good devices for getting hold of information, but they're only one option. There is a concentration on the business sector with screens and keyboards. What about old, basic methods of communication? What about voice? One of the most skilled group of information scientists in the world, certainly in Australia, are telephone operators. I was talking to a group of telephone operators in Sydney last week who are now tackling the problem of new operator services, and it's a very basic question. As well as giving out numbers including just about the most basic question of all - 'where am I?'. (people who work in country exchanges quite often have calls from people in isolated phone-boxes who simply say, 'where am I?'. Now if any skilled information scientist could provide me an answer to that ... . And that's precisely what telephonists do, by tracing the telephone call.)

One of the great concerns of people involved in the information industry is what they term 'deliverable' - i.e. delivering the hard-copy. It seems to me that there are other means of looking at 'deliverable'. By requesting information and having it delivered into your home, coupled together with a technological bias, cheap facsimile is now becoming available, cheap printers in the home, but also the telegram service currently being down-graded by Telecom and OTC.

So finally - government information, collected at public expense should be used for public benefit, not as a secret mine, or secret gateway.

In a book which is published next month I talk about computer literacy [13]. We've really accepted the concept of computer literacy, again without challenge. What that obscures is the decline in our society in the skills of print literacy that we acquired relatively recently over the last hundred years. And that what we lack in the process is curiosity, what we lack is skepticism. The exercise of those qualities will assist ordinary citizens in the search for relevant information. It is, in the end, once you cease regarding information as a product, the people who can best determine how important the information is, are the people who want it. And it seems to me that we should aid them in the task of finding it.

References

1. Matthew Lesko, 'Information USA', Penguin Books, New York, 1983.
2. Lesko, op. cit., p. 38.
3. Lesko, op. cit., p. 3.
4. Lesko, op. cit., p. 3.
5. Jeremy Seabrook, 'Unemployment', Quartet Books, London, 1982.
6. Paul Zurkowski, Information Industry Association (unpublished), 1983.
7. Paul Hawken, 'The Next Economy', Holt, Rinehart and Winston, New York, 1983.
8. Ian Reinecke, 'Micro Invaders', Penguin, 1982.
9. Quoted in Reinecke, op. cit.
10. Reinecke, op. cit.
11. Ian Reinecke and Julianne Schultz, 'The Phone Book', Penguin, 1983.
12. Lesko, op. cit., p. ix.
13. Ian Reinecke, 'Microcomputers', Penguin, 1983.

CONSTRUCTING NATIONAL DATABASES

- A centralised operation -

Margaret A. Findley

Australian Council for Educational Research
PO Box 210, Hawthorn, Vic. 3122
(03) 8181271

Paper presented at the Victorian Association for Library Automation second national conference 'Information management' held at the University of Melbourne - 29 November 1983.

Abstract

Three elements can be identified concerning national information services: national in coverage; national in clientele; national in availability. The Australian Education Index as an example of a national database, is developed centrally and is one of the ongoing projects of the ACER Library and Information Unit. The objectives are to collect, store and disseminate information for the Australian education community. Five requisites for a viable database system are applied to the AEI system: source materials; user group; operational system; control and management; funds and revenue. Factors considered in the database construction stage include the modification of existing manual system, standards, criteria of host system and other information systems; record format, flexibility and simplicity. Five products are derived from input files of the database.

1 Introduction

My paper today is concerned with the construction of national databases and to consider specifically systems which are controlled by one organization. I intend to utilize the operations of my own organization, the Australian Council for Educational Research and the development of the Australian Education Index database as a case study.

During the seventies it was predicted that

> 'the 1970s and 1980s will be a time of breakthroughs, victories, defeats and dismal failures with respect to successful computerization of information. At the close of this dynamic expansion period, databases will be integral to most organized activities in business, industry, education, government, and the home.'(1)

In Australia, developments have followed this general trend. In the early seventies offline or batch systems were used to

match search terms against database contents. In the following years, online systems have taken over from the batch systems and the matching process took place interactively. Search results were gained almost instantly and searchers were able to modify and extend their requirements in order to develop precise and meaningful results. Today, systems are available in which data may be manipulated for problem solving and report writing.

The development of bibliographic databases followed these trends both overseas and in Australia, with early developments following another prediction that 'this revelation most often occurs when manual, paper based systems are being converted to computer-supported systems'. (2) Three of the first Australian bibliographical databases were developed by organizations who were providing national information services in hard copy format. Operations more or less were manual and utilized traditional card systems for recording and sorting entries. These services were Australian Public Affairs Information Services (National Library of Australia), the Australian Education Index (Australian Council for Educational Research) and the Australian Science Index (CSIRO). Co-ordination and public access of these services took place with the establishment of AUSINET by ACI Computer Services in 1978.

2 National Information Services

At this point there is need to determine the criteria for a national database or information service. Three elements can be identified concerning national information services.

1 National in coverage. Information or documents are gathered from all areas of the nation or country; refers to all facets of the activity within the nation e.g. in education this could be interpreted as education in all states, at all levels and for all groups of people.

2 National in clientele. A service which is intended to meet the information needs of all groups of the nation or, more specifically, in a subject oriented file.

3 National in availability. A database which is publicly available and linked through Australia-wide telecommunication facilities.

An extension of this model may add a national co-operative element in which the clearinghouses participating in some or all of the processes of document identification, collection and indexing form an Australia-wide network.

3 Australian Education Index Database

In my case study, the Australian Education Index database is one of the ongoing projects of the ACER Library and Information Unit which operates within the ACER structure and is funded in part from the core grant to ACER from the public sector.

Its principal objectives are as follows:

- To provide the education community with easy access to information on research and practice in the field of education.
- To ensure that all reliable and worthy information is located and processed.
- To generate and maintain adequate products for the dissemination of this information in both hard copy and machine readable format.
- To co-ordinate with other education information services within Australia to ensure comprehensive coverage of information without unnecessary duplication of activities.
- To maintain a collection of information and documents within ACER to ensure the preservation of Australian information for further and historical research.

ACER is uniquely placed in a centrally but independent position within the Australian education world. The controlling committee or council has representatives from all State educational research institutes, Education Directors-General and the Commonwealth Department of Education as well as elected representatives from the education community. Consequently it should have access to the major policy and decision making groups as well as other

research bodies but can be autonomous from the constraints and control of these groups.

Because of the Unit's long experience in information transfer, it has assumed a unique position in the Australian education field and has gained ready acceptance by the education community as the appropriate organization to develop and maintain a national education database.

Tellis in his paper at last year's workshop on the Generation and Management of Small Scale Databases further develops the Park model for the development or construction of databases.

4 Requisites for Database Construction

Five requisites for a viable database system are given:

1 The target information or source material.
(A sizeable and growing area of information which is useful but not readily accessible.)

2 The clientele or user group.
(A relatively large population of users who would use this information if it were accessible.)

3 The database or operating system.
(A system through which the two could meet; a storage and switching mechanism.)

4 Control and management.

5 Funds and revenue.
(Resources to sustain the operation.)

The database itself may be part of a more extensive information service and consideration needs to be given to the identification of external factors concerned with the environment in which the database will operate.(3)

4.1 Source Materials

Information or document coverage is one of the most important considerations of any database and the results of searches will be affected by the source and scope of the documents selected. The value and strength of the file is in the continuous inclusion of documents which relate to, cover and reflect the objectives

of the system. Criticisms of certain systems by users often reflect the lack of knowledge of the scope of documents intended for capture for the file and it is the responsibility of the database producer to clearly define the document selection and acquisition criteria to the users.

With the objectives of the service and the potential user group in mind, potentially-relevant documents are identified and acquired. Because of the national approach of the Australian Education Index, source documents include all Australian generated material both in published and unpublished forms in the field of education. Education is interpreted in the widest sense and information concerned with all areas and all levels of education, teaching and training is included. Broad subject categories covered by the service are: Educational history; Educational research; Educational philosophy, policy and development; Sociology; Educational planning and administration; Educational facilities; Teaching profession; Educational personnel; Educational management; Psychology; Study; Teaching; Curriculum planning; Educational systems and institutions; Special education. The varied formats of documents are categorized as: monographs, research reports, program descriptions and evaluations, state-of-the-art reviews, conference papers, periodical articles, legislation, parliamentary debates, newspaper articles, reviews of books and resources, tests. The procedures for acquiring the documents are numerous and are co-ordinated with the acquisition procedures of the library. These means include: gift, exchange, purchase and inter-library loan.

After acquisition, documents are assessed for inclusion in the database. Four factors are considered as selection principles in which the nature and scope of the documents are related to the defined subject and users needs:

* Appropriateness of content/subject matter;
* Suitability of format, medium or document type;
* Quality of content;
* Availability of document.

Quality is the single most important selection criteria and although a document may satisfy other criteria, it should be rejected if the quality is not sufficient. Conversely, a high quality document may be considered although there are problems in availability.(4)

4.2 User Group

The potential user group or market of the database is identified as the complete education community and includes:

* Policy-makers (Ministerial and departmental personnel)
* Administrators (Regional superintendents; Principals, College administrators)
* Practitioners (Lecturers; teachers)
* Researchers
* Librarians
* Students (Post secondary).

4.3 Operational System

During the developmental phase of the construction of the database, the design decisions relate to the content of the database and also the information dissemination process. Factors which further influence these decisions are concerned with the format of the stored data, the mechanics of entry input into the database, and also the means by which the user will access the information. At ACER the following factors were considered in the database construction stage:

1 Modification of the existing manual system in order not to inconvenience or disadvantage users of the service. There are, of course, advantages as well as disadvantages in this style of development. The framework of the indexing service which includes the objectives, coverage of source material is established and forms the basis of the development phase. However, the format and record detail which is already determined and also the need for the continuation of the paper copy of the file may restrict flexibility in the decision making.

2 National and international standards for database design.

3 Criteria of the intended host system, AUSINET and specifications of other files mounted on the system.

4 Specifications of existing information systems which were known already to the proposed audience e.g. ERIC (Educational Resources Information Center, USA).

5 Accepted bibliographic record format in the Library and Information community, e.g. AACR.

6 Capacity to produce the hard copy Australian Education Index in a format close to that used prior to automation as well as to produce the database.

7 Flexibility which is capable of adapting to changing requirement.

8 Simplicity in order not to place unnecessary demands on data preparation staff.

9 Punctuation and spacing within records suitable for output formatting and online searching.

The AEI database is created on the ACI Computer Services facilities and stored as a public file on AUSINET. Most input is done by ACER and from June 1981 the in-house Wang Word Processor is being used for this purpose. Software support to construct and update the database is provided by ACI Computer Services. Hard copy products are produced using ACI CS INDICAT systems and computer typesetting facilities at Valentine Computer Services.

The AEI file on AUSINET is updated quarterly at the same time the input is submitted for processing through the INDICAT program for the hard copy AEI. These operations are shown in Figure 1.

4.3.1 Vocabulary control

Although most retrieval software systems like STAIRS, STATUS, ORBIT, DIALOG have full or free text retrieval capabilities, the current trend in database construction is to maintain the controlled vocabulary for the subject analysis of documents. The arguments for and against the controlled vocabulary has been debated extensively.(5)

Following the ERIC model, the AEI database assigns descriptors from the Thesaurus of ERIC Descriptors. A special program was undertaken in 1982 and 1983 to modify the ERIC Thesaurus in order to develop an Australian Education Thesaurus. System work for the thesaurus has been carried out by the ERIC Processing and Reference Facility in Bethesda, Md. It is expected that the new thesaurus will be available in early 1984 in both hard copy and also as a subset of the AEI database.

4.4 Management of the System

The System was developed by ACER with the co-operation of ACI Computer Services. Management of the whole system is carried out by ACER.

During the past few years discussions have been held with several specialist organizations who might participate in the identifying, collection, indexing or dissemination of information in specific areas of education or to selected groups of users. To date, two organizations have developed and are operating clearinghouses, namely the National TAFE Clearinghouse and the Australian Clearing House for Library and Information Science. Both these bodies prepare data for the database and the hard copy AEI and, in addition, take responsibility for the dissemination of the information by means of specialist hard copy indexes.

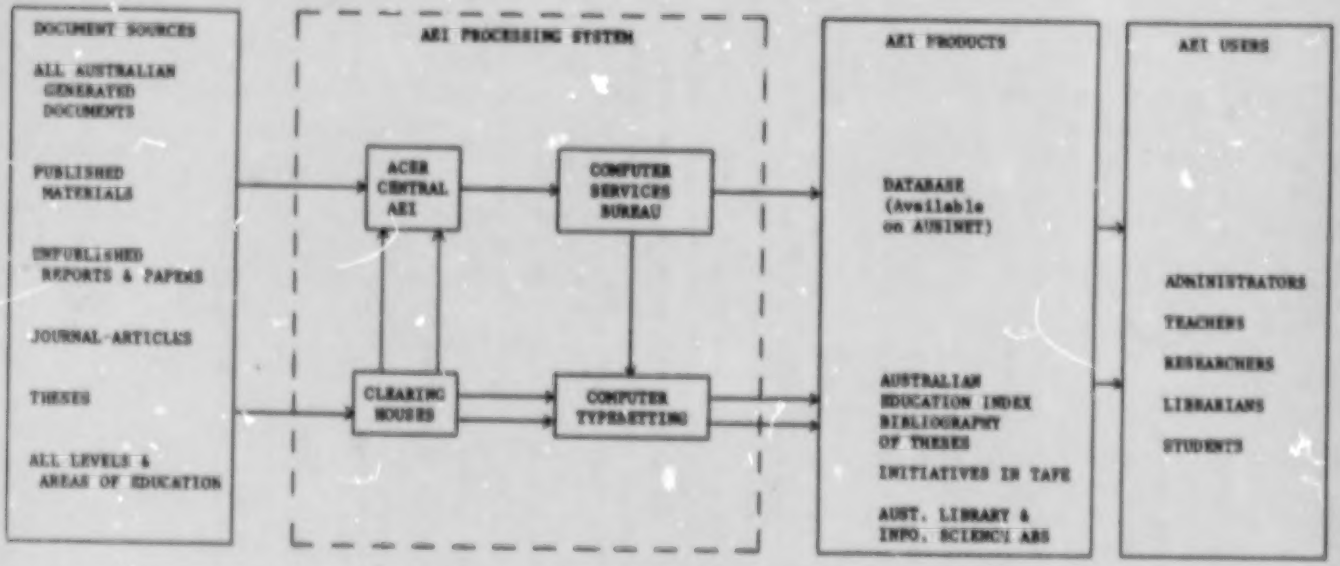
The products which are derived from the input files of the AEI database are listed below:

Australian Education Index
- Published by ACER
- Quarterly - March June September
- Annual cumulation - December
- 1937 -

Database - AUSINET
- 1978 -
- AEI File
- BETA File
- Update - February May August November

Bibliography of Education Theses in Australia
- Published by ACER
- First Issue - 1982 Annual

Figure 1 AEI - Operational Systems



Initiatives in Technical and Further Education
Published by National TAFE Clearinghouse
1-2 issues each year
1980 -

Australian Library and Information Science Abstracts
Published by ACHLIS
First issue - 1983 Annual

ACER co-ordinates with other bodies involved in information transfer in education through the recently established Australian Education Council Working Party on Informational Retrieval. The Committee monitors relevant activities in Australia and identifies areas of concern and for further development in order to enhance the available services.

4.5 Operating Funds

As indicated earlier the core grant to ACER from the public sector supports in part the professional staff engaged on the maintenance of the database. Other costs which include input costs, database update, hard copy Index production are supported from the sales and royalties of the products.

5 Conclusion

Current developments indicate a move from the centralized operational model. With the cessation of the Australian Science Index, the Australian Public Affairs Information Service remains as the only large file centrally operated. Current developments especially those in the public sector seem to follow the co-operating model. Perhaps shared decision making and resource allocation enable governments to support these developments.

References

1 Huffenberger, Michael A. and Wigington, Ronald C. 'Database management systems' in Annual Review of Information Science and Technology, v.14, 1982, p.153. White Plains, NY: Knowledge Industry Publication for ASIS.

2 Ibid, p.154.

3 Tellis, Des A. Small scale data bases - management, control, cost benefits. In The Generation and Management of Small Scale Data Bases: papers for a Workshop, p.114-126. Canberra: Library Association of Australia, 1982.

4 Findlay, Margaret A. Document acquisition and input selection - Criteria for selection in The Generation and Management of Small Scale Data Bases: papers for a Workshop, p.25-29. Canberra; Library Association of Australia, 1982.

5 Gerrie, Brenda. Subject control in small scale data bases. In The Generation and Management of Small Scale Data Bases: papers for a Workshop, p.46-60. Canberra: Library Association of Australia, 1982.

CONSTRUCTING NATIONAL DATA BASES: THE STREAMLINE PERSPECTIVE

Beverley Forbes
Department of Resources and Energy
Water Programs Branch
GPO Box 858
CANBERRA ACT 2601

(062) 45 8222

Abstract

Bibliographic data base development is an expanding field of information management in Australia. A case study of the Australian water data base, STREAMLINE, is presented to highlight some of the approaches that have proved successful in constructing this national data base. The approaches discussed are: the co-operative institutional arrangements for the establishment of the data base; the combination of a central co-ordination unit in a non-library environment and a network of participating libraries; the inclusion of bibliographic and research information in one data base; and the development of an integrated publicity program in parallel with the establishment of the data base. The system is still at an early stage of development, but it is being positively supported by the water industry.

Introduction

Bibliographic data base creation is an expanding field of information management and services. It is well established overseas, and is becoming increasingly more important in Australia. An Australian water data base recently has been established to fulfill the information requirements of the Australian water industry. This data base is known as STREAMLINE.

In designing and developing STREAMLINE a number of distinctive approaches were used. It is the purpose of this paper to highlight and comment on the effectiveness of several of these approaches. Those approaches discussed are:

- the use of co-operative institutional arrangements for the establishment of the data base;
- a central co-ordination unit located in a non-library environment;
- the reliance on a network of contributing libraries;
- the inclusion of bibliographic and research information in the one data base; and
- the development of a publicity and education program as an integral part of establishing the data base.

STREAMLINE: Australia's Water Data Base

The Australian water industry consists of a small number of major water agencies at State government level, a large number of small local water agencies, and a number of consulting firms. These groups are all heavily oriented towards the engineering disciplines, mainly civil engineering. During the past decade the Australian water industry has faced a range of increasingly complex problems. Resolution of these problems requires a better understanding of a wider range of issues, such as environmental and social considerations, besides the traditional engineering issues. The information needs of the water industry therefore have increased.

The existing local information services have not been able to keep pace and provide rapid and comprehensive access to local information. As well, the distinctiveness of the Australian aquatic environment means that much overseas information and experience is inapplicable. The STREAMLINE data base has been developed to assist in filling this information gap. STREAMLINE is therefore designed specifically to satisfy the national information requirements of the Australian water industry.

STREAMLINE is a computerised bibliographic data base that aims to comprehensively index and abstract literature relevant to all facets of water and wastewater. All such literature produced by Australians or about Australia will be included. STREAMLINE contains references to published and unpublished documents and current research projects. Material from 1982 onwards is included, as well as significant water documents produced earlier. The data base presently (March 1984) contains 2500 records and is updated every six to eight weeks. Each year at least 2000 new bibliographic records will be added to STREAMLINE and the 1000 current research projects listed, will be updated. A special retrospective indexing program is now also in progress to include important water documents produced before 1982.

STREAMLINE is available on the Ausinet information system. In addition, two printed publications are produced from the data base. These are a regular current awareness bulletin known as STREAMLINE Update and an annual directory of current research projects - Water Research in Australia: Current Projects. These publications facilitate wider dissemination of information from the data base, as many small local water organisations do not yet have access to online information retrieval services.

Co-operative Institutional Arrangements

STREAMLINE has been developed co-operatively by the Commonwealth and State governments under the auspices of the Australian Water Resources Council. Development of the data base in this framework is considered particularly appropriate because the Australian Water Resources Council is the Commonwealth/State ministerial level committee concerned with the co-ordination of national water issues. As well, it was an Australian

Water Resources Council working group on water information that initially examined the information needs of the Australian water industry and recommended the development of an Australian water data base. By working through Council and its committees there has been wider ministerial and departmental involvement and commitment to STREAMLINE which contributed significantly to the success of the data base. Establishment and operation of STREAMLINE was set within the broader framework of other water information services. The data base clearly supplements, rather than replaces, those services. Further information on the background to the development of STREAMLINE, and the structure of the system, have been documented in the report of the working group on water information to the Australian Water Resources Council 1982*.

Central Co-ordination Unit in a Non-library Environment

Co-ordination of a data base's total operation is essential to avoid overlap of activities and duplication of effort, and to maintain a smooth sequencing within and between activities. The co-ordination of these functions is best performed by one organisation, centrally located, and in close contact with the user group.

STREAMLINE is centrally co-ordinated by the Department of Resources and Energy under the auspices of the Australian Water Resources Council. Co-ordination at the Commonwealth level assists STREAMLINE in maintaining its national orientation, and achieving a comprehensive coverage of material from all States. The co-ordination unit also ensures that there is a balanced coverage of material from all relevant disciplines, subject fields and record types, for example, conferences and research projects. This form of co-ordination is strongly supported by the major water agencies.

---

*Australian Water Resources Council, Working Group on Water Information. 1983. Water information needs in Australia. Canberra, AGPS, xiii 63p. Australian Water Resources Council occasional papers series; no 7.

The specific responsibilities of the STREAMLINE co-ordination unit are:

- overall co-ordination of the development and operation of the data base;
- preparing entries;
- encouraging input from network centres;
- editing entries;
- expanding the network; and
- as required, the development of other water information services.

The co-ordination unit has been established in the Water Programs Branch of the Department of Resources and Energy, rather than in a library environment. The benefits of such a policy area location are:

- ready access to subject experts for advice on indexing and abstracting problems;
- through contacts developed by a subject specialist area, closer and better relations with the water industry;
- access to a pool of information and experience in disseminating information to the water industry; and
- access to an infrastructure for publishing and distributing publications.

While these benefits are considerable, there are also some problems created by a non-library location. The data base is a long term activity requiring set staff and resources. This does not always fit well within a system oriented towards the shorter term goals and activities of an area primarily concerned with advising government. Also, there is no pool of reserve specialist information staff. Despite these problems the benefits of STREAMLINE'S current location are considered to clearly outweigh the difficulties.

Network Structu

To ensure a comprehensive coverage of water information for STREAMLINE and to maximise dissemination of its output, a network of participating centres was developed in association with the co-ordination unit. The network is based on major State water agency libraries as their parent organisations are the major producers and important potential users of water information services.

The structure of the network also reflects the positive co-operative attitudes which exist amongst the water agency librarians. Since the early 1970s water agency librarians have met on a regular basis to discuss water information issues. This has resulted in the development of a cohesive group with an ongoing commitment to co-operating and improving water information services in Australia. STREAMLINE has considerably benefited from this group's established interaction.

More specifically, the STREAMLINE network centres perform four major roles. They:

- prepare entries for the data base;
- disseminate output;
- provide document backup services; and
- publicise STREAMLINE.

The network centres index documents produced by their own organisation and also a selected list of journals.

By participating in STREAMLINE the network agencies benefit from the wider dissemination of their publications, improved access to local water documents, greater information retrieval capacity, and savings in staff time currently employed on manual literature searches.

The effectiveness of the STREAMLINE network after the first nine months of operation has been examined. In addition to the number of entries contributed, this examination has considered: the standard of entries,

the value of material being indexed, the comprehensiveness of the contributions, and the other functions of the network centres. As well, the difficulties and pressures that network centres face in being involved in a project such as STREAMLINE should not be underestimated. They include consideration such as the data base task being a small one in the midst of many other library activities which are often more pressing, staff turnover problems, and the intermittent use of the indexing and abstracting guidelines and the relevant thesaurus does not lend itself to developing expertise in completing data entry forms.

So far the STREAMLINE network is seen to be working effectively. Network centres are indexing approximately half of the current input to the data base and it is expected that this rate of input will continue. The quality of the input is high. The other roles of searching and publicising the data base are also proceeding satisfactorily.

We believe that the key to the present success of the STREAMLINE network relates to four factors. First, the commitment to the data base by the network centres' parent organisation; second, the network centres and their organisations understand now they can benefit from their involvement with the data base; third, the established interaction between water agency librarians; and finally, the co-ordination unit committed to encouraging and keeping informed, on a regular basis, all the groups involved with STREAMLINE.

Having established STREAMLINE with the water agency libraries plans are now being made to expand the network to include other important groups producing water documents. Efforts will focus on Commonwealth and State government departments, specialist water research groups and consultants in the water field. The network is also being expanded to provide a more comprehensive geographic coverage throughout Australia.

Combination of Types of Information

Traditionally bibliographic data bases have focused on providing references to published documents. More recently their coverage

has expanded to include other types of information in one data base. STREAMLINE provides details of research-in-progress and unpublished documents as well as published documents. These various types of information have been included in the data base because they are important information sources for the water industry.

Descriptions of current research projects are an important information source for researchers and those seeking contact with them. The value of this information source has been recognised for a long time by the water industry. This is evidenced by water researchers having contributed details of their research projects to the Australian Water Resources Council for inclusion in a regular directory of water research since 1965. Bibliographic and research-in-progress records have been combined in STREAMLINE so that there is only one major source of local water information to search and the anticipated usage rate could only justify one data base.

Combining these information forms made the task of producing the data base more complex because: research information had to be collected from different sources and in a different format to the bibliographic entries, and the permanent nature of bibliographic entries and temporary nature of research-in-progress records had to be reconciled. These peculiarities were overcome by careful planning involving:

- the development of the data base's record structure with some unique and overlapping paragraphs for the two record types;
- the use of an annual survey to obtain summaries of current research projects being undertaken by over 400 research organisations and individuals throughout the country; and
- the operation of the research component of STREAMLINE as a subfile of the bibliographic data base with the subfile replaced annually by the updated research entries.

STREAMLINE brings together references to documents and current research projects for those who are interested, but has a facility to restrict

retrieval to either documents or research projects if desired. When this approach was first proposed for STREAMLINE it was unusual in the Australian context. This approach has now become more widely used.

In acquiring unpublished documents for STREAMLINE, efforts so far have focused on indexing the material produced by State water agencies. (A program for including thesis information will commence later in 1984). Including this unpublished material in STREAMLINE is relatively easy because the entries are collected and indexed by the network centres in the same way as published entries. A particular effort does however have to be made to encourage water agencies to make this material available for indexing.

Integrated Publicity Program

In making STREAMLINE publicly available it was important to have a good public image and to encourage participation. We believed this could be achieved in two ways. First, by having consistent, valuable and easily understood records in the data base and a viable number of entries to make searching the data base worthwhile once it was publicly available. Second, by an effective publicity and education program that developed in parallel with the data base to make the existence of the data base known, and to encourage usage of the data base by all elements of the water industry.

The consistency of records was achieved by getting the 'bugs' out of the data base record structure before the data base was operational. When STREAMLINE was made public it contained all 1982 current research projects, but fewer bibliographic records than planned. The decision was taken to make the data base public with less than a desirable number of records because the research entries would lose their current impact with time delays, and those records formed a searchable data base in their own right. As well, having the data base public provided an added incentive for network centres to meet their indexing commitments and encouraged other potential contributors to provide information about, or copies of their publications for indexing. A particular effort is now being made to increase the number of bibliographic entries in STREAMLINE to a more viable level by a retrospective indexing program. With additional indexing resources it is anticipated that STREAMLINE will contain at least 4000 entries by mid-1984.

Even though STREAMLINE was created in response to user needs it was recognised that many potential users would be unaware of the availability of such services, and how to use them. As well, contributors to the data base would require training and documentation to assist them in preparing entries. A publicity and education program therefore was developed simultaneously with the development of the data base. It consists of the two major components:

- publicity material and education for users of the data base, and
- training and documentation for contributors.

For the publicity material to achieve the desired impact with users, the services of a graphic consultant were used to develop a name and logo for the data base. The logo and name are used on all STREAMLINE publications making them easily recognised.

Response to STREAMLINE

STREAMLINE has been publicly available on Ausinet since July 1983. Despite the limited number of records in the data base it has been well-used, being exceeded in terms of connect hours per month, only by data bases that have been in existence for several years. Over 1000 copies of the first editions of Water Research in Australia: Current Projects and STREAMLINE Update have been distributed and the co-ordination unit has received many additional requests for the publications from a wide range of interested groups and individuals. Both users and librarians have been enthusiastic about STREAMLINE, and the data base has received very good support.

Conclusion

Establishing a national data base is generally a complex task requiring substantial resources and effort. The decision to create a data base should be taken cautiously, but once it is made, it should be pursued vigorously. We believe that the features of STREAMLINE which have been discussed in this paper have made a major contribution to the success which the data base has enjoyed.

INFORMATION TRANSFER SYSTEMS

DEVELOPING THE SATELLITE OPTIONS FOR LIBRARIES

JOHN A. GILLAM

Formerly with the Innovative Technology Group of the National Library in Canberra. Now working at the Commonwealth Department of Communications. This paper expresses a personal viewpoint.

ABSTRACT:

The Australian communications satellite system, AUSSAT, will go into orbit from July 1985. Information transfer opportunities for Australian libraries include the dissemination of literature appropriate to the AUSSAT system, the direct reception of television programs for public viewing, and the extension of the viewing arrangement into a community videoconferencing facility if and when entrepreneurs make such videoconferences available. The satellite opportunities discussed are technically simple, administratively straight forward and relatively inexpensive. They await the initiative of Australian librarians.

November 1985

INTRODUCTION

The Australian communications satellite system owned and operated by AUSSAT Pty Ltd will become operational in just two years time. As an information transfer system, the satellites will supplement the existing telecommunications network and mass media outlets. The degree to which libraries could be involved with satellite communications is the subject of this paper.

A recent article in the Australian Library Journal [1] explored the potential in developing special satellite-based communications networks for such library applications as on-line cataloguing and database searching, facsimile transfer and teleconferencing. The general conclusion was that library applications operate at or below the relatively slow data speed of 2400 bps and, in these cases, are therefore more affordable and appropriate using the existing Telecom Australia data network.

If Australian libraries are to start using AUSSAT satellite links for data communications, it is likely to be as part of the general network architecture of the established networks such as AUSINET, CSIRONET or the AUSTRALIAN BIBLIOGRAPHIC NETWORK. The individual libraries would remain connected by TELECOM AUSTRALIA lines to the major nodes of the networks. The network host organisations, however, may choose to interconnect the nodes by satellite links. Similarly, small remote area community libraries may become the indirect beneficiaries of satellites for data communications. Some libraries currently without an STD quality telephone may be sufficiently remote for TELECOM AUSTRALIA to contemplate upgrading the service using satellite earth stations. Such satellite usage, however, is peripheral to what is generally meant by developing satellite options for libraries.

This paper covers three aspects of satellite communications of relevance to Australian libraries:

1. SATELLITE LITERATURE

In the information transfer game, librarians as much as anyone else are in need of good and timely information about satellite options. Australia has developed a unique satellite system involving:

- a basic two satellite orbital configuration
- usage of 12/14 GHz frequencies
- higher and lower powered transponders on each satellite
- zonal and national beams.

On top of these technical factors, there are a number of government policies concerning the usage of the satellites. The first group of these policies was announced on 15 November 1983 by the Minister for Communications. The policies covered earth station ownership, direct broadcasting from the satellites, and the relay of satellite program services to television stations. The net result is that Australia is evolving a national satellite system and service which has no exact parallel elsewhere.

The amount of literature on AUSSAT has been scant and rather technical. That situation is slowly changing and should pick up pace as we get closer to the proposed July 1985 launch of the first satellite in the series. The satellite company, AUSSAT Pty Ltd, has begun its marketing drive with a number of simple brochures and more could be expected to follow.

Unrealistic expectations in relation to the Australian satellite system can be easily raised by reference to overseas literature. America is the most prolific publisher of satellite books and magazines. For the most part, the American literature deals with satellite systems which differ from the Australian system in terms of transmission frequencies, earth station dimensions, market sizes and government regulations.

There is some obligation on the part of Australian libraries (whether public, academic, school or special) to ensure that their clients and their librarians can be made appropriately aware of the Australian satellite system's capabilities and potential.

2. LIBRARY FACILITIES FOR TELEVISION VIEWING

Some libraries provide a range of audio-visual materials which include television viewing facilities for videocassettes or off-air broadcasts. The AUSSAT satellite system will provide an additional source of television programming through what has come to be called the Homestead & Community Broadcasting Satellite Service (HACBSS). This service will be programmed by the Australian Broadcasting Corporation (ABC) from Sydney, Brisbane, Darwin, Adelaide and Perth. The expectation is that HACBSS will carry a television and two radio channels.

Reception of the HACBSS signals will be by access to an earth station facility costing about $1000 and featuring an outdoor dish antenna typically 1.2 to 1.5 metre in diameter. It is intended that the earth stations be easily installed by a home handyman. Testing of HACBSS earth station prototypes is currently being undertaken at field sites at Port Hedland, Alice Springs and Innisfail using simulated satellite transmissions from a transmitter atop a 30 metre mast. The tests will determine earth station performance in a wide range of climatic conditions.

Remote area school libraries may be among the first to acquire HACBSS reception facilities to provide televised educational aids for teachers and students. The facility would replace the existing videocassette loan schemes operated by Departments of Education to distribute ABC schools broadcasts.

Community libraries in remote areas might also have a demand for public video viewing facilities which could be augmented by the direct reception of the HACBSS signals.

Libraries in urban areas with video facilities will already have access to ABC programming through terrestrial transmitters. The reception of the HACBSS signals carrying ABC broadcasts might be an attractive proposition if:

- the library is located in a particularly difficult television reception area

- the ABC programs available locally are different from those on the HACBSS signals.

The difference between some ABC broadcasts on the satellite and those locally transmitted is explained by reference to the zonal beams used for the HACBSS signals. The south-eastern beam covers NSW, Victoria and Tasmania; the HACBSS uplink will be in Sydney for that beam. The Northern Territory and South Australia are covered by the one beam; programs from Darwin and Adelaide will share the same beam and, therefore, will be available in both the Territory and the State. The western and north-eastern beams separately cover Western Australia and Queensland respectively and do not provide any overlapping zonal beam service areas.

The possibility exists technically for the HACBSS television channel to carry other material when not used by the ABC. There are administrative difficulties in that kind of channel sharing but the ABC "down time" could be a useful resource to other organisations. The idea was floated by the National Library of Australia in 1980 [2] of using the HACBSS "down time" for the video distribution of films in the National Film Lending Collection. At that time, the National Library estimated that 80% of its current film lending was conducted within the geographical area covered by the south-eastern beam. Increased viewing of the films could be achieved if some of the films were distributed via the HACBSS signals and recorded in local schools.

The initial analysis of the concept, known as INFOSAT, indicated that sufficient films could be cleared for copyright purposes to enable the broadcasting and recording to proceed. The problems that remain concern funding and access to satellite capacity. Only the ABC has been authorised to program HACBSS and it is unclear at present whether there would be time or authorisation for any additional uses of the HACBSS television channel.

The concept of INFOSAT is applicable to any film library faced with serving scattered populations with single copies of sought after films. There is a high likelihood that the relatively inexpensive HACBSS earth stations will be available throughout most of remote Australia. Consequently, it is these earth stations which would give the best means of implementing the INFOSAT concept. Lower powered transponders could be used but the size and cost of the earth stations would increase.

The distribution of films in this way could be undertaken in the "off" hours when demand on transponder capacity was at a minimum. Automatic time clocks on videocassette recorders at user sites would make the midnight to dawn period just as useful as any other time period.

An implementation strategy for INFOSAT may have to wait a little longer until the availability of the NACBSS transponders for such uses becomes known. Even an hour a day might go some ways towards increasing the viewing of library lending films. Lower powered transponders would also be useful but the increased size of earth stations required for reception may prove at least initially to be a barrier to the acceptance of the service.

3. VIDEOCONFERENCING

A variation of the INFOSAT film distribution concept is the real-time presentation of a videoconference via satellite. A similar one-way video link would be required and viewers could participate by using TELECOM AUSTRALIA telephone lines back to the originating site of the videoconference.

Satellite access using AUSSAT for videoconferencing is anticipated as being confined to the lower powered transponders using zonal or national beams. Antenna sizes are somewhat larger than for the NACBSS signals. Lower powered transponders in a zonal beam may require a 2.4 metre diameter antenna for the audio-video signal and, in the national beam, require a 3.0 metre antenna on the earth station. Earth station costs would consequently vary from $10,000 to $15,000 approximately.

A few American public and academic libraries are participating in the Public Service Satellite Consortium's national videoconferencing network. This network uses one-way television and telephony talkback. The motivation for libraries to participate in the network comes from the librarians' mandate to serve the information needs of the community. Some revenue is also generated for the libraries by the hire of their equipment and facilities.

The videoconference is originated generally as an adjunct to a major conference or by business houses wanting to launch new products to their dealers across the States. As far as the libraries are concerned, it is just like receiving any other satellite-relayed television program for direct viewing in the library by the public.

Some Australian libraries may find this idea attractive when and if such videoconferencing begins in Australia. Local government may support such a facility as a community asset and find it usefully located in the public library. Major academic libraries may incorporate videoconferencing facilities as a necessary part of the general usage of their campuses for all types of conferences.

Libraries with an eye on exploiting the newer information transfer systems may like the idea of installing satellite television receiving equipment not only for HACBSS but also for videoconferencing. The questions that would then arise concern the type of earth station required at the library.

There will be two, and possibly three, satellites in the AUSSAT orbital configuration. An earth station can look at only one satellite at a time. If services are required from each satellite, a separate antenna is required for each or a movable antenna is needed. Until the allocation of AUSSAT transponders is known and entrepreneurs make services available, it is difficult for libraries to make hard decisions about installing a range of satellite receiving equipment. However, launch date for the first satellite is less than two years away and now is the time to be on the lookout for opportunities.

The potential for interconnecting libraries via satellite is given a wider discussion under the heading of the LIBSAT project [3]. The notion of incorporating high speed facsimile with videoconferencing is explored in the context of a general purpose satellite communications facility for major libraries. This specialised satellite network would complement the terrestrial telecommunications network.

Conclusion

The Australian communications satellite system, AUSSAT, provides libraries with a number of opportunities to further fulfil their mandate to serve the information needs of the community. One of the most immediate concerns is to provide library users and librarians with up-to-date and relevant literature on the AUSSAT system and services. Unrealistic expectations can stem from overseas literature dealing with satellites having characteristics different from those of AUSSAT.

The first direct use of the Australian satellites by some libraries is likely to be the reception of ABC television broadcasts to augment other video viewing services provided by the libraries. The extension of this relatively uncomplicated use into videoconferencing could be contemplated by some libraries as a community satellite videoconferencing access facility. The videoconferencing would be a one-way television link with telephony talkback and would make only slightly more demands on libraries than the direct reception and public viewing of television broadcasts from AUSSAT satellites.

These satellite opportunities for libraries are technically simple, administratively straight forward and relatively inexpensive. They await the initiative of Australian librarians.

References

1. John B Miller,'Satellite communication: some implications for libraries', in Australian Library Journal, 32(1983, no.4):26-37

2. National Library of Australia. INFOSAT services: preliminary analysis / prepared by John A. Gillam. Canberra: National Library of Australia, 1980.

   Summarised in:

   J A Gillam, 'Infosat Video Service', in Media Information Australia, (February 1981): 64-66

3. John A Gillam and Gwenath Haslewood, in 'LIBSAT: Library Satellite Interconnection Project', LASIE, 12(1981, no.2-3):18-27

CUSTOMER GUIDELINES IN THE CHOICE OF TELECOM DATA PRODUCTS

Kevin Ziebell, Data Marketing Branch, Telecom

Telecom has four data communications products which can be used to support data communications applications. John [G'llam] indicated that satellites have very good strengths in certain areas, and so do our services - we think we have the range of products which will cover your needs. [Fig. 1]

The product I want to speak to you about today is our AUSTPAC product. AUSTPAC was launched in December '82. We've had some initial difficulties with this product, but it is a high-technology product, and, as you'd expect there have been some teething problems. But I'm pleased to say we're well on our way to solving these problems, and we anticipate increasing our promotion and marketing of this product early in the new year. You people can have a look at this product and its applications and judge for yourselves the applications it's well-suited for, and whether it suits your needs.

Let's assume you want to access remotely a database on a computer system; for example a host could be located in Canberra and you might be in Darwin. You can access that database, getting access to that information at 30 characters/sec via our public switched telephone network by dialing up the database. You can get continuous printing for 1 hour for $4.50 (approx.) [Fig. 2]. This compares with our STD rate of about $44 per hour. You can see that very significant communications cost savings can be made using AUSTPAC. In fact AUSTPAC is well-geared and intended for customers who have long-distance communications requirements. If you're looking at long-distance communications and relatively low volumes, I would suggest that AUSTPAC is the way to go for the '80s and into the early '90s.

I now want to give you some guidance in determining the particular data product that best suits your needs, and these are some of the factors which you should take into account. [Fig. 3].

Usage.
That is, how much use are you going to make of that product. Are you going to use it during the day, at what times, and what are the geographical locations involved.

Frequency.
That is, how many times a day are you going to use the service, or access the database.

Length of session.
That is, how long are your sessions going to be. Are they going to be short, sharp bursts of 4 or 5 minutes, or 4 or 5 hours.

The application.
The application we have in mind needs also to be taken into account. Is it for example, an on-line/enquiry application, a database application or perhaps a facsimile application.

Support.
Manufacturers and suppliers support is also important. As the X.25 protocol we use with AUSTPAC is a relatively new development, we find that manufacturers and suppliers in Australia are having to go through a learning curve, i.e. becoming familiar with what AUSTPAC is all about before they can see what support they can provide for it.

Flexibility.

Fig. 1 TELECOM DATA PRODUCTS

- DATEL
- DDS
- AUSTPAC
- NOACS

Fig. 2 FACTORS AFFECTING CHOICE OF TELECOM DATA PRODUCTS

- USAGE
  - Day
  - Time
  - Geographic location
  - Frequency
  - Duration
- APPLICATION
- MANUFACTURER/SUPPLIER SUPPORT
- FLEXIBILITY
- SERVICE
  - Availability
  - Provision time
  - Performance
  - Restoration time
- COST

Fig. 4 GENERAL GUIDELINES FOR USE OF TELECOM DATA PRODUCTS

- DATEL (DXL)
  - Itinerant use
  - Switched connection
  - Low volume
  - Point-to-point
  - Intra-city
- DATEL (DPL)
  - Regular use
  - Dedicated connection
  - High volume
  - Point-to-point, multipoint, multistream
  - Intra-city
- DDS
  - Regular use
  - Dedicated connection
  - High volume
  - Point-to-point, multipoint, NETSTREAM, NETPLEX
  - Intra-state or inter-state
- AUSTPAC
  - Itinerant/regular use
  - Switched/dedicated connection
  - Low volume
  - Point-to-point
  - Speed change
  - Protocol conversion
  - Intra-state, inter-state

This is another consideration. You might find yourself in a situation where you're experiencing very heavy growth in demand from your users. Alternatively you could find yourself in a very stable environment with relatively little growth. Obviously you need a product that best suits your changing requirements.

Service.

Service issues which customers need to be conscious of are -

-- availability of the service. With some of our data products, such as our Digital Data Service, we are experiencing very high demands from our major data users.
-- provision time. How quickly can the service be provided.
-- error-rate performance.
-- restoration time. That is, how quickly can that product be repaired and back on the air again.
-- cost.

Figure 4 indicates some general guidelines to assist you in determining the particular product that suits your needs. It also indicates the characteristics of our DATEL service, of which we have two versions: a dial-up version (DXL) or a leased-line version (DPL).

The dial-up version is one in which we use the telephone handset to dial up our connection to the computer system, and we transfer from voice-mode to data-mode. The characteristics of our dial-up customers generally are that they require the service on a sporadic basis, i.e. not a heavy but a casual user occasionally wanting to interrogate the database. I would imagine that a lot of you would have that particular type of application. These customers are also looking for a switched connection to be able to switch between different databases. This implies that we must have a switching infrastructure to be able to do this. You might want to switch to AUSINET, for example. You're looking at low-volume applications with our dial-up service (i.e.. you're not in the heavy to medium league, moving large volumes of data around the country). You're looking at a point-to-point application (from location A to your central computer site - typically the city and metropolitan area of our capital cities).

If these are the characteristics of your application then I'd suggest that our DATEL service is well-suited to cater for this. Our DATEL service was introduced in 1969, and is continuing to serve into the '80s, and will continue to be our major service until the early 1990s.

Our DATEL-DPL service is another variation of our DATEL service whereby you have a dedicated leased line. It's intended more for the regular user - a dedicated connection always accessing a single database. If you want to access a different database on a different system, then you need another dedicated connection.

For high-volume data transfers we can have point-to-point (A-to-B type applications), or multipoint (where we have a host computer polling a number of different terminal devices out in our network at different locations), or we can have multistreaming (which provides us with a cheap means of combining a number of data streams into one aggregate stream, which we send on our inter-capital city link). Our DATEL-DPL service is also well-suited to intra-city applications.

Our Digital Data Service, which was launched in December '82, provides a

Austpac Applications

Data Base/Shared Resource Working

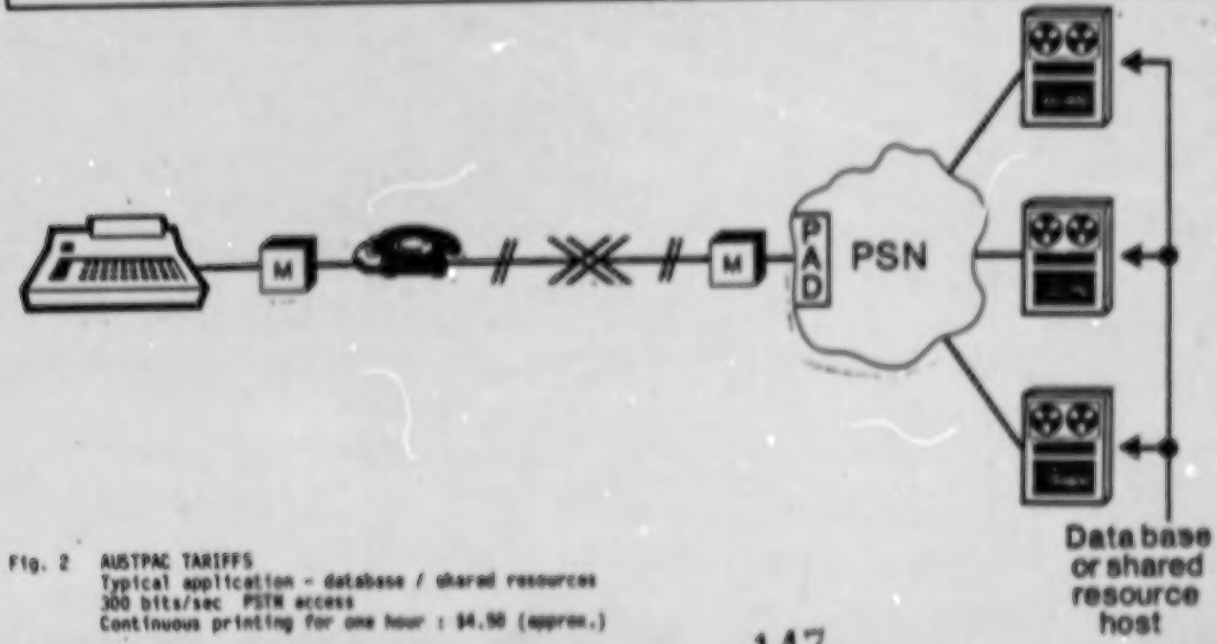


Fig. 2 AUSTPAC TARIFFS
Typical application - database / shared resources
300 bits/sec PSTN access
Continuous printing for one hour : $4.50 (approx.)

dedicated connection, with Point-to-Point and Multipoint facilities, which are functionally similar to our DATEL service. There are two new facilities NETSTREAM and NETPLEX, which offer combined transmission and multiplexing.

The tariffs which we've structured for our Digital Data Service are well-suited to intra-state traffic, e.g. from Melbourne to Ballarat or Bendigo, or say from Sydney to Newcastle, or interstate traffic from say Melbourne to Sydney.

Our AUSTPAC data product is intended more for sporadic than regular use, depending on the application. You can have either a switched connection to the network (i.e you dial-up AUSTPAC with a telephone), or a dedicated connection. It also has the ability to undergo speed changes - the network can take care of this for us. Likewise, protocol conversion, say from character-mode protocol to X.25 protocol, is taken care of by the network. It's intended, like our Digital Data Service, for inter- and intra-state traffic. AUSTPAC is distance-independent, so you pay exactly the same charges if you're here in the central business district of Melbourne, as you would out beyond the black stump. So you can see it will allow you to provide cheap communications access to users in remote locations.

For those heavy-volume data users who might be anxiously awaiting the release dates of some of our new DDS facilities, we will be supporting multipoint services on an interstate basis from December '83. Likewise our NETPLEX facility (which offers combined transmission and multiplexing) and a new telecommunications standard customer interface called X.21 will be released in December '83. Around mid-1984 we will be opening up Multipoint to country and local areas, with Point-to-Point and DATEL access facilities at a later date. (DATEL access facilities support customers outside the local capture area of one of our Digital Data Service nodes.) [Fig.5].

Figure 6 may be useful to you in indicating the costs you are looking at if you are comparing two products, and you can see that it bears out my earlier point about costs. E.g. the Sydney-to-Melbourne route, at 2400 bps, for our DATEL service is about $14000, and about $7700 using DDS. And the further you go the greater the cost savings.

Figure 7 shows where the break-even points are for our data products. For 2400 bps, if we are looking at costs only, and at none of the other qualitative advantages that our digital product has over our analogue product, you can see that about 12.8 km is the break-even point, as so on for the other speeds. Fig. 8 shows the cost savings that can be made with our Digital Data Service and the NETPLEX facility. If you consider the situation where you might have say 20 lines coming into your host site, then so far as communications access charges are concerned, with our DATEL product your looking at about $32000, as opposed to the DDS/NETPLEX charge of $8000. What this means to you, the customer-user is an immediate cost saving of around $23000 per annum.

I hope that this session has given you some insight into the sort of questions you should be considering, prior to discussing with your Telecom business consultant your particular data communications application.

Fig. 5 RELEASE DATES FOR NEW DDS FACILITIES

SERVICE	DATE
Multipoint (interstate)	Dec. 1983
NETPLEX	"
X.21 Customer interface	"
Multipoint (country/local)	March 1984
Point-to-point (country/local)	"
DATEL access	To be announced

Fig. 6 TARIFF COMPARISON (per annum)
DATEL v. DDS

ROUTE	Speed (bits/sec.) 2400		4800		9600	
	$	$	$	$	$	$
Sydney-Melbourne	13878	7788	16974	11604	18214	17292
Sydney-Canberra	8719	4322	10877	6432	12117	9520
Sydney-Brisbane	14076	7788	16808	11604	18448	17292
Sydney-Perth	29835	10092	36026	15060	37266	22464
Melbourne-Brisbane	20085	10092	24326	15060	25566	22464

Fig. 7 BREAKEVEN POINTS
DATEL v. DDS

Speed (bits/sec)	2400	4800	9600	48K
Distance	12.8km	22.2km	20.2km	7.0km

Fig. 8 NETPLEX LINE COST SAVINGS

Example of 20 x 2400 bits/sec line access charges at host site:

DATEL
(20 x $1580) $31600

DDS
NETPLEX $8004

Cost saving : $23,596 p.a.

DEVELOPMENT OF REGIONAL INFORMATION SYSTEMS

Hamish M. Russell
Director of Scientific and Information Services
Department of Agriculture
G.P.O. Box 4041
MELBOURNE VICTORIA 3001

and

Margaret Irving
Information Services Officer
Department of Agriculture
G.P.O. Box 4041
MELBOURNE VICTORIA 3001

Phone: (03) 651 7824 (business)
(03) 720 5105 (private)

ABSTRACT

Rising costs and competing demands for limited funds have lead the Department of Agriculture to review its practice of providing library material on-site as compared with making the information available from somewhere within a statewide network. A project has been initiated to study the potential of existing communication technologies to meet the needs of country-based staff without maintaining extensive collections of documents on-site. The paper discusses the project, which utilises a Que file on Ausinet for library holdings, computer searches and SDI's. A scenario for the future, based on electronic publishing, is briefly discussed in light of the Department of Agriculture's network.

DEVELOPMENT OF REGIONAL INFORMATION SYSTEMS

"We have only experienced the first stages of the information revolution! The next stage will see a further integration of computerization and telecommunications ... which provide instant access to information stored anywhere in the world to anybody who can operate a telephone." Barry Jones, Sleepers, Wake! p. 183

1. INTRODUCTION

The theme of this paper could be "How to make your dollar go furthest in a network situation". The network discussed here is the Victorian Department of Agriculture's library system which services staff located throughout Victoria. The broader issues discussed at the end of the paper could extend the network, with co-operation to other related services in Australia and overseas.

The Department of Agriculture's library and information service has the charter to provide research, extension and management personnel with relevant, and up-to-date information from the bank of world knowledge in appropriate subjects and various formats. The nature of the Department's activities dictates that many of its staff are in country locations where they are required to provide specialised advisory (extension) and diagnostic services to the farming community and carry out research of international standing.

To try to meet the information needs of its staff, the Department's library service is currently organised into five main libraries (professionally staffed and in the metropolitan area) and 35 branch libraries and book collections throughout the State. This arrangement has evolved over the life of the Department with conscious planning for a network only taking place in the last 10-15 years (Russell in McClellan, 1983).

The demands placed on the library service are considerable - and growing. Along with growing demands are escalating costs and budget constraints. Maintenance of existing levels of service and on-site access to primary material is impossible and therefore how best to spend the information dollar is uppermost in management's mind.

As with most libraries, our library service has gone through the exercise of cutting out the "fat" in the system. Journals were critically reviewed and little used titles and most duplicated titles at the five main libraries were cancelled. Book acquisitions were reduced to minimal levels. The "fat" was only considered to exist in acquisition of information rather than staffing levels which were already seen to be minimal and even inadequate to meet existing and anticipated demand. In fact, throughout the paper no comparison is made between spending resources on staff and on collection development. In our case (as in many organisations), operating funds are most at risk and must be exploited to the fullest.

2. APPROACHES TO REGIONAL ACCESS TO INFORMATION

The question which faces the Department of Agriculture's network of libraries (as with most networks) is: "Do we try to make the information base as broad as possible by eliminating duplication and providing access from a remote location, or do we duplicate some titles at many locations, thus reducing the total information base?" We could call the first case "absolute access to information" - the information is available somewhere in the system but not necessarily on site. The second case where information is provided on site could be called "distributed access to information".

In the past, the Department has tended to work under the "distributed access to information" system. The costs, of subscriptions in particular, have made the distributed information system, while still maintaining the broad (absolute) information base demanded by staff, a luxury that we can no longer afford. It is clear that we must make a choice between the two approaches.

To try to come to grips with the consequences of each scenario, the Department began a two year project in 1982, to evaluate available technology which could provide remote access to information and therefore reduce the need to maintain a "distributed information" policy. A number of technologies were considered, either alone or in combination. These included: telex, telefacsimile, videotex, reliance on computer searching and SDI's.

Videotex was rejected after some consideration. Although the Department was already conducting a videotex trial with a group of farmers in Gippsland, the Library Service did not have the resources, either financial or manpower to mount a large enough trial to be meaningful. Videotex relies on having a bank of information for users to access - that bank of information did not exist, nor did we have the staff resources to create it.

Telefacsimile was seriously considered. Telefacsimile would speed up document delivery but that was perceived to be the only area where it would have great impact. From previous experience and a consultant's survey of information requirements (3), high speed document delivery appeared to be necessary in only a small percentage of requests. Frequently, the times when immediate access to primary documents were required, were for diagnostic work where illustrations are as, or more important than text. Current technology (at least at an affordable price) does not provide adequate reproduction of photographs. No doubt improvements are being made constantly and in five years decisions could be different.

Knowledge by scientific staff of what relevant information existed was seen to be the most important consideration. Delivery of appropriate primary documents could be accomplished through traditional means of mail and courier systems. Therefore, decentralised access to the broadest possible information base was tackled first.

The first area considered was decentralised access to information about the Department's own library collections. Knowledge by staff of the material held within the Department had been limited to a central union catalogue (main entry access only), current accession and current awareness listings and an annual bibliography of our own publications. When talking about making the "information dollar" go furthest, we were not even fully exploiting our existing collection!

As you can imagine, control of collections at 40 locations, with only five staffed by information professionals on a full time basis is a difficult task. Computerisation of the catalogue was the obvious choice, but it had to be in a way which would provide greatest access - "access" meaning both for the end-user, irrespective of physical location, and access from the point of view of maximum entry points to the information contained on the file.

Traditional computerised catalogue systems of the card catalogue on fiche or on-line would not satisfy the needs of our staff where detailed subject access is paramount. After looking at numerous systems - with virtually another one arriving on the desk each day, we had to draw the line and make a decision. The Department of Agriculture did not have a central computer facility therefore an external bureau seemed the only choice.

A private Que file on A.C.I.'s Ausinet was the final decision for a number of reasons:

1. Searching capabilities on STAIRS information retrieval system was considered to be at least as good as other information retrieval packages available.

2. Staff (library and end users) would not have yet another set of protocols and command language terms to learn as AUSINET was already being used for ABOA (Australian Bibliography of Agriculture).

3. Dial up access was possible from any location - many Departmental establishments already had microcomputers and with inexpensive software and/or hardware additions, these could be used to access AUSINET.

4. Costs of access and storage were reasonable in the short term.

5. We could design our own file for our own needs - special agricultural thesauri could be used rather than the very limited Library of Congress subject headings.

6. We could maintain the option to transfer the file to an in-house computer without too much difficulty.

7. ACI had more experience than other vendors with bibliographic databases.

We developed the file with assistance from ACI staff. We began development early in 1983 and were testing the prototype in March-April. Final changes were made to the prototype and by the end of June, the file consisted of 2,000 records. (Currently there are 3,000 records).

In the database, bibliographic details are entered in standard AACR II format, broken up into a number of fields within the record. It is a standard our staff are familiar with, and we saw no reason to change.

Emphasis was given to in-depth subject indexing. We have a relatively "controlled" vocabulary using CABVOC, which is a thesaurus of approximately 100,000 terms developed by the Commonwealth Agricultural Bureaux. CABVOC is not yet commercially available in Australia but it is intended for use as the indexing tool for the CAB database. We have found it necessary to supplement CABVOC in the areas of public affairs and economics with APAIS, and in veterinary medicine with MESH. As well as using these terms (major descriptors), a minor descriptor broadly covering the subject of the whole document using L.C. has been included at this stage for production of printed subject listings.

Regular updating services, such as a monthly accessions list, are being produced from additions to the file. We intend to produce a microfiche version of the catalogue (which necessarily will have limited subject access compared with the on-line catalogue) as a stop-gap for locations without terminals. The Library Service will mount an extensive public relations and training campaign to encourage most end users to directly access the catalogue on-line rather than rely on the microfiche.

The other area that the project has concentrated on is use of computer searching for access to information.

Although there have been a number of studies on end-users doing their own searching (4) and comparisons of agriculturally related databases, it was felt that not enough was known about how research and, in particular, extension staff would make use of these facilities; what is the quality and relevance of information provided, and how all of this compares with existing methods of searching or scanning. Basically, the question was: "Could we move from a distributed information system to an absolute information system yet still provide the necessary access?"

To study this, five officers were chosen at each of six locations. Half the sample were research officers and half extension (advisory) officers. Initial discussion with staff indicated a certain amount of scepticism for the project and, in some cases, outright antagonism. The antagonism was for two quite different reasons - some saw it as a threat to their on-site collections and there has always been a strongly possessive attitude to books and journals, while some others (extension officers) believed that it was a waste of time and money because computer searches would not provide them with relevant applied information. Anyway they didn't have time to read !

Interviews were held with each officer to ascertain current methods of acquiring information and the subject requirements for establishing profiles for SDI's. An initial search covering one year's articles was carried out for each officer. The results were evaluated by the participant and an information officer and an individual SDI established. When studying the search results closely, it became obvious that the inconsistencies in indexing of records had marked

effects on retrieval and that these inconsistencies (mainly in the level of specificity in indexing terms) were far more prevalent than we had predicted. As expected, some staff, once they saw the type of reference retrieved stated "well what I really want is ....." and proceeded to be more specific. Expectations of some officers of the quantity of material published were also unrealistically low.

Another difficulty which appeared in matching user requirements with search results was distinguishing between pure and applied research reports. The research officers on the whole were interested in both aspects of their subject but most extension officers were only concerned with the practical developments/studies which they could relate directly to their work situation. In the CAB database (as in most databases), there is no categorisation of the type of report or intended audience, and restricting the SDI's to particular journal titles to try to eliminate pure research, was unsatisfactory given the range of titles publishing relevant material. It is interesting to note that this issue of level or intended audience has been specifically addressed in the Australian Bibliography of Agriculture (ABOA).

One very basic issue which became obvious early in the project was the necessity to engender enough interest in reading the scientific literature for it to form part of the regular work routine for scientific staff. A parallel need is to establish amongst users an appreciation that library/information services could be an active, rather than passive, contributor to the working knowledge of their specialities. Extension officers, and even a few of the researchers, were prepared to rely to an inordinate degree on

the interpretation of new knowledge by colleagues, together with browsing some of the journals that were held on-site. For most extension officers, these on-site collections are usually very limited.

So far, the comments received from the participants have indicated that 50 percent or more of the relevant articles identified in searches had not been seen by them. Obviously this type of service is providing greater access than pre-existing patterns, including use of current awareness services or abstracting journals. There is of course a "convenience" factor involved here due to staff not having to take time to scan relevant indexes. However if this type of service saves staff time, then information services are fulfilling an important part of their role. Some of the participants are diligent library users and for them the comparison of access is valid. As many libraries are discovering, increasing access to secondary information increases the demands made for provision of primary material. A previous study that we made on the usefulness of SDI's showed that only between 30% and 50% of documents were held within the system while the rest had to be procured from other Australian libraries or from overseas. This emphasises the need to keep the absolute information base as broad as possible given rising costs involved with inter-library loans and delays in making information available to our staff.

FUTURE DEVELOPMENTS

Our organisation is gradually moving towards an "absolute information" policy, so far more by necessity (than wish), particularly of the users. This trend will have to continue

for the time being unless there are major increases in library funding. The access technology project, which intends to study the effects of this type of policy was probably instituted at the wrong time. Developments in information technology are happening all the time, but aside from computer access to bibliographic databases, major changes which can be expected to have an impact on the way we access or acquire information are not quite with us. One of these changes will be videotex which will provide users with directory type information and will act as a gateway to remote computer facilities. The most attractive feature of videotex is its user friendliness. The different protocols required for access to various information providers or computing facilities are made transparent allowing easy transition from one system to another. The recent announcement that Telecom will become the national carrier for videotex will act as a catalyst and no doubt we will see rapid development of this communication system over the next few months. The Department of Agriculture is currently in the middle of the second year of a pilot videotex project and it is planned to launch a public system in 1984/85.

The Department has concentrated on developing its videotex information base as a means of communicating externally to the general farming community. As a networking system for internal transfer of information it also has considerable potential. However, not only must we be aware of its potential, but also of its limitations. Not all forms of information are suitable for accessing via videotex.

As a publicly accessible system, ultimate developments with this technology will depend on public acceptance of a fee-for-service information product and parallel developments with computer networks.

One of the frustrations of bibliographic database searching is the necessity to learn (and remember) the various command languages for each system. There are at least 20 major hosts which are possible to access all with differing search commands and protocols (5). This is an area where information specialists should continue to campaign for some standard commands. At a national forum on ayricultural information, held in September 1983 at Orange Agricultural College, one of the major recommendations put forward concerned "the need to co-ordinate common access and usage procedures for computer based services". These sentiments have been referred to the Federal Minister for Communications, Federal Ministers for Primary Industry, for Science and Technology, for Home Affairs and the Standing Committee on Agriculture.

Perhaps vendors see differences in their systems to their advantage, particularly for those who have a monopoly on some large international databases. Training courses must also be a "money-spinner" for the various computer bureaux. However as Bonta (4) stated, if some standards were employed, vendors would surely benefit as end-users would be encouraged to do their own searching, thus increasing the level of use.

The other frustration of reliance on computer searching for access to information is the present unreliability of systems. Although representatives from bureau services are

usually quick with statistics on the low level of "down time" of their system, for the users it seems that all too frequently the system is not available or not working properly when it is needed. From our experience, this is particularly true of using DIALOG via Midas.

There is an increasing number of source or full text databases available. This area is likely to grow rapidly in the short term with cheaper and more efficient data storage.

The division between full text databases and electronic publishing is not clear cut. This area of technology will have significant effects on the concept of distributed versus absolute access. Distributed access will become less important as access to remote sources of information (or absolute access) through electronic publishing becomes cost effective.

So far there is little available in this area relevant to the Department of Agriculture, but we have had some informal discussions with Elsevier about the possibility of obtaining full texts of relevant journals in machine-readable form. The discussion has centred on provision of tapes, or even diskettes, which could then be accessed from computer facilities within the Department. The printed form of the journal would only be provided on an article request basis and royalties would be paid to the publisher per article printed. At present, however, the technology available does not appear to be able to adequately cope with reproduction of photographs and diagrams which are so important in much of

our work. This is one of the stumbling blocks with electronic publishing and has contributed to the delay in its commercial development (6), (7).

It seems Surnsey (8) in his review of electronic publishing, is filled with horror by the development of electronic publishing of journals. He sees it as "the most extreme instance of technology push with no market pull" (8, p. 395). We would dispute that, as we would see ourselves as being part of a potential market for electronic publishing. It could provide us with the means of supplying a broader range of relevant material for our "information dollar".

The advent of full text databases and electronic publishing will extend the available network and distributed information policies will of necessity become much harder to justify. Absolute access will be possible through vendors, be they publishers or computer service bureaux. The situation of "information on demand" could be the scenario. Instead of paying for printed copies of complete journals, where a significant proportion of articles might never by read, clients will only pay for information requested. Inter library loans could be a thing of the past, with requests directed to "publishers" rather than to other libraries. Within this context the information specialist/librarian would play a key role in directing staff to relevant information.

This ideal situation is not yet a practical proposition but all of the technology exists and it is not unrealistic to plan for such an eventuality.

There is a challenge to all of us to come to grips with what it means to become effective information processors rather than information collectors.

The information professional will have a key role in these developments. Many of our users will be reluctant to give up on-site collections of primary documents and even more will be reluctant or unable to effectively exploit the technology to identify relevant material. The information professional can look forward to greater involvement in helping users to exploit new technologies and much less time and effort on acquisition and control of collections.

New technology can release us from less productive work and we must develop our knowledge and experience through pilot projects such as ours so that our users can take advantage of a new world of information.

REFERENCES

1. Jones, Barry. Sleepers, wake! technology and the future of work. Oxford University Press, Melbourne, 1982.

2. Russell, M.M. User requirements and standards for Agricultural libraries, paper presented to 52nd ANZAAS Congress, Sydney, 1982, in McClelland, D, (Editor), Agricultural Information Systems, AIAS/AGRIAA, 1983.

3. Bunbury, A. Information services - survey of usage by Departmental staff. Confidential report for the Department of Agriculture, Victoria prepared by Task Consultants Pty Ltd 1980.

4. Bonta, Bruce. Online searching in the reference room. Library Trends, 31(3), 1983, pp. 493 - 510.

5. Foster, A. External databases: an overview. Aslib Proceedings, 35(9), 1983, pp. 346 - 353.

6. IRCS moves into electronic publishing Communication Technology Impact, 4(2), 1982, pp. 1 - 3.

7. Borrell, Jerry. Developments in electronic publishing. Bulletin of the American Society for Information Science 8(5), 1982, pp. 11 - 15.

8. Gurnsey, John. Electronic publishing: a market perspective. Aslib Proceedings, 35(10), 1983, pp. 389-397.

ABSTRACT

The author surveys contemporary developments in information technology, particularly as they relate to information management, and comments upon their appropriateness. Specific fields covered, both for Australia and for overseas are: developments in mainframe computing technology and software; personal and microcomputers; telecommunications systems; office automation; information retrieval systems; and videotex. The paper concludes with a suggestion for the establishment of an Australian Institute for Information Management.

IAN McCALLUM

28.11.83

NEW PRODUCTS AND APPROPRIATE TECHNOLOGY

Keynote address, VALA'83: Second National Conference on Library Automation, Information Management. Melbourne, November 1983.

Ian McCallum, Manager, Information Retrieval Systems, ACI Computer Services.

INTRODUCTION: TECHNOLOGY

You can't send a telegram in the UK.[1] The precursor to the information age is breathing its last, a casualty of the efficiency of digital transmission techniques.

Since 1856 it has been possible to send a telegram in Australia. Now the writing is on the wall for the service that helped make a nation from disparate States. A few months ago, sharp tariff increases were introduced. Last month Telecom invited expressions of interest from equipment suppliers for a "Text Messaging Service" to be implemented "in the earliest possible timeframe". The proposed new service is to include electronic mail accessible from the telephone, packet-switched and telex networks, links between telex machines and communicating word processors (now called teletex terminals), and electronic mail for teletex terminal operators.[2]

The British Department of Industry is proposing an electronic document delivery service based on teletex to be operational early next year. Called Project Hermes, the planners envisage electronic mail and document delivery

services for 5p a page, as well as links to external database searching systems.[3] At last the ends of the circle join. Document identification and document delivery in the one system. What a boon for information seekers.

Again in the UK, Pergamon Infoline is advertising for staff to implement a mini-computer based publishing management and composition system. The intention is to combine online editoral control and document composition, including graphics, with the production of databases for electronic distribution. Pergamon promises applicants "the most exciting development in print since the Gutenberg Bible."[4]

Pergamon's microcomputer based videodisc patent searching system has been around for some time. But did you know that Grolier Inc. and the Longman Group have joined forces to work towards the production of an electronic version of the Academic American Encyclopaedia? Old hat, you say, already available in videotex from Dow Jones and in text from BRS. But this time there's a difference. The joint project is aimed at integrating electronic text with sound and image stored on videodiscs. You can view newsreel footage of historical events, or locate, then listen to Beethoven's Fifth.[5] In future, telling the kids to shut up and get on with their homework will not necessarily lower the decibel level.

LaserData Inc., a Boston firm, claims a breakthrough in laser videodisc technology. New recording techniques make it possible to store approximately one million pages of full text on a single side of a single 12 inch disc for about a cent a page. Storage capacity is 30 times that of magnetic tape, 2000 times that of double-sided, double-density floppy disks, and 3000 times that of microfiche.[6] Simply add a microcomputer to gain access to individual words in records. Collect your own databases. No royalty or connect time charges, and no telecommunications costs.

Want to go further with videodisc? How about this?

> "The reader sits at a touch sensitive television screen with audio speakers. A graphic table contents displays a "chapter map" of the book's contents, and brief descriptions of the information found in each chapter. The computer-type-set video pages are accessed and perused by finger touch; there are combinations of high quality text, dynamic colour illustrations, and sound. Personal annotations are possible by hand-written notes on pages, digitally recorded audio, or "video snapshots" recorded on a writable optical videodisc.

Created at MIT and called the "Movie Manual", the system's proponents describe it as a prototype electronic book, a means of electronic publication for collecting, distributing and retrieving pictures, sound and data from one compact durable source.[7]

It seems you don't have to be Ford Prefect to have a copy of the Hitch-hiker's Guide.

Quite interesting to hear about developments in the pipeline, but what of the new products? What has been produced and is now available for purchase and use? The computer industry has always blurred the distinction between promise and performance, between concept and reality. To put the question in their terms, we're not nearly as interested in what exists logically, as in what exists physically.

Here are a few examples of working systems.

The American Library Association has launched its own electronic mail and information service on ITT's Dialcom. ALANET, as the service is called, permits the ALA's 3100 organisational members to communicate electronically with ALA offices in Washington and Chicago, and with library suppliers, libraries, library associations and other publishers throughout North America. In addition, the ALA has its own databases accessible, covering current information on conferences, legislation and publications.[8] Is the Library Association of Australia interested?

The Delphi service offered by the General Videotex Corporation of Cambridge, Massachusetts, has been running for 10 months, 24 hours a day. Using videotex technology, but without requiring expensive colour monitors, Delphi is pitched at home computer users bored with games and simple programs and itching to plug in to the wired society. It offers electronic mail, bill paying, selected news and sports items by topic, a 100 billion character research library, an online encyclopaedia with over 20,000 entries, online shopping, online schedules, travel, hotel and car reservations, chat, an auction system for users to sell possessions to the highest bidder, group novel writing, a public message service, articles for reading, and hardware and software reviews. From rates as low as $5 an hour outside prime time.[9]

In the UK a telesoftware system is available on Prestel for those who never tire of programming. The Micronet 800 service offers 100+ free programs, mainly for home and educational use, with a further 50 programs that can be downloaded at around $8 per program.[10]

And what of the personal computer? An unprecedented explosion in intellectual capabilities? A status symbol for the intellectually insecure? Or as faddish as Hot August Night? Could it be the silicon equivalent of James Last's last beach party?

I don't think so. My own employer will place about one third of all IBM PCs sold in Australia this year. For all brands, near enough to 20,000 personal and home computers will be sold in Australia in 1983. A long way short of the 520,000 video cassette recorders sold in the same period[11], but way ahead on sales revenue.

It has been estimated that by the end of this year about 13 million personal computers will have been installed, world-wide.[12] 70% of them in the U.S. and just over half of them in the home.

Why so popular, and why are such optimistic growth rates projected?

I think there are several reasons:

1. Personal computing is a game between man and machine in which the odds of winning are stacked in man's favour. I'm not sure of the psychological factors involved in destroying the last Martian invader or winning a game of chess or completing a bug-free program or successfully and illegally copying proprietary software, but it does seem that all these activities involve considerable satisfaction for the perpetrators. And a pleasant experience tends to be sought at least a second time.

2. The user controls the PC, including the speed of development of the man/machine relationship, and the rate at which tasks are processed. Since personal computing is an individual affair, no-one else notices mistakes and little embarrassment is caused.

3. The packaging of hardware and software is usually most attractive. From twenty feet away you could be forgiven for thinking a communications board was a box of chocolates, or the latest from Inter-flora.

4. Compared with large computer systems, humming away in their controlled and clinical atmospheres, PCs are inviting, not intimidating. DEC's little girl, Apple's junior executives and IBM's Charlie have softened the image of technology.

5. The wide range of off-the-shelf software makes the PC immediately useful for thousands of different tasks.

Last month IBM's PC became the number one US seller, less than two years after its late entry to the market. The name, and the range of available software appear to have been the prime factors.

In 1982 the major printed guide to the IBM PC listed 1000 different expansion and software products. One year later it listed 2200. The major increases were in system software (to increase the capabilities of the PC) and in application packages (to increase the number of specific tasks that can be performed on the machine).

Here's a sampler of software:

1. INTELLIGENT TERMINAL
   An asynchronous communications package that allows the user to connect to other systems, record retrieved data on a disk file and transmit previously recorded data from a disk file. $150.

2. ELIZA

"... a non-directive psychotherapist that analyses statements as they are typed in and responds with its own comments or questions."

$ 25.

3. COMPLETE CHURCH MANAGEMENT PROGRAM

A church finance system recording contributions by household, plus full membership details. No price.

4. DAVID's MIDNIGHT MAGIC

A high resolution video pinball game with dual flipper controls, upper and lower playing levels, multiple ball play, electronic deflectors and many more special effects. $ 35.

5. ANTHEM

For children. The student commands an ant to move about, plant seeds and eat. The ant can see, smell, perceive its position, orientation and appetite. It teaches structured programming by learning new commands, making shapes, dancing, following a maze and other activities. $ 50.

6. NUTRI-CALC

A dietary, nutritional analysis program listing 730 consumer foods by 18 commonly used food nutrients. Stores recipes and menus and calculates ideal calorie intake based on age, sex, desired weight and activity level. $350.

7. STORY MACHINE

Children write sentences, paragraphs and stories using a supplied vocabulary. The program then animates the story. $ 35.

8. B-1 NUCLEAR BOMBER

This one is certainly topical, but not for the faint-hearted. The PC operator is the pilot of a B-1 bomber on a mission over, you guessed it, the Soviet Union. The object is to fly through the Russian defence, bomb the target city, and return home through MIG fighters and surface-to-air missiles. $ 21.

9. VC

For those who prefer their war games to be retrospective, for $25 you can re-live the Vietnam war.

The same directory also lists 41 word processing programs from $100 - $1000, and 30 database management systems from $75 - $2800.[13] In the US, 250 new packages for the IBM PC are released every month. Microcomputing has considerable momentum.

Time now to address the topic: New products and appropriate technology.

In 1981 VALA was meeting the challenge of technology in an ambitious and successful attempt to identify both the nature of the challenge posed, and the responses of those challenged. By the end of the Conference, a base-line for library automation had been found. The main activists had had their platform or their chances for questions, and most types of automated systems had been covered in some depth, and a few in passing. For those participants who had arrived wondering where to start with library automation, practical advice was readily available. For those pondering the policy issues, a rich selection was presented. The Conference and its members did indeed confront the technology head-on.

Two years later its very different. The development of information technology has proceeded to the point where it is no longer possible to confront the monolith, instead we are enveloped. And we realise we have to choose very carefully which route we will take to our digital destination.

> "Ignorance is the curse of the age we live in. We talk about the dark age . When was there one so dark as this? We have smothered ourselves, buried ourselves, in the vast heap of information which all of us have and none of us has."[14]

We could watch, fascinated but inactive as the technology expands around us. Inaction can be a very attractive option. Or we can respond to the changes taking place by pushing the technology in the direction we wish to travel, and refusing to be pulled by it into detours we have no wish to take. It seems to me that in 1983 VALA's organisers have worked hard to provide appropriate luggage for the trip.

The Industries Assistance Commission's discussion paper on new technology and industry assistance defined "technology" as "that body of information, skills and experience which has been developed for the production of goods and services... it includes scientific and technical knowledge regarding particular products and methods of production, enquiry and managerial knowledge."[15]

For me, the last two words are key. Just as controlled burning is the most effective bush-fire prevention method, the application of managerial knowledge to the information base we've constructed through meetings like this, is the most effective way of employing available technology. Fight fire with fire.

And if we are to choose a label for this activity, "information management", the Conference theme is spot on. It implies that we intend to take charge, direct and control that most nebulous of commodities, information.

The information I shall be concerned with is electronic information - information in digital form, whatever its origin. "New products and appropriate technology" boils down to "recent things suitable for particular purposes". My "things" are easy to identify - they're computer and telecommunications systems. But my "purposes" are much more difficult to pin down. What is the purpose of information technology? Surely to simultaneously improve the efficiency and effectiveness of information services, to increase productivity and at the same time to enlarge and enhance the range and quality of services. What on earth does the last sentence mean?

Should I assume that in a society characterised by international hostility, inflation, high unemployment, unequal access to justice and opportunity, and led by the masters of Newspeak, that computer-based solutions for the creation, maintenance and interrogation of factual and textual data are likely to lead to better informed citizens and from them to a more enlightened and less self-destructive society? It sounds silly, but I think I have to. There has to be some justification for choosing our field over, say, drug importation. And the point seems to stem from our success in managing data to provide for the information, recreation and education needs of those who directly or indirectly maintain us. I think we believe that accurate information, properly delivered, is intrinsically good. And in this labyrinth of value judgements we rely on criteria established by our peers to decide what is good. Hence the topic. New products - certainly. But <u>appropriate</u> technology.

For the remainder of this address I promise to stay in touch with the topic by considering different areas of information technology from the point of view of the contribution each makes to improving the flow of electronic information, since this is what I have defined as the task of my information manager. Those areas are computer systems and telecommunications systems in general, and office automation, personal computing, information retrieval and videotex in particular.

COMPUTERS IN INFORMATION MANAGEMENT

To the casual observer, most of the development work and almost all of the publicity surrounding data processing, relates to microcomputers. Since the last VALA Conference the microcomputer has come into its own. But behind the vision of a new future created by advertising agencies, the mainframe suppliers have been steadily enhancing the capabilities of their machines. Processing speeds, data transfer rates and storage capacities have been markedly increased to support ever more sophisticated applications.

For online library and other information systems characterised by requirements to support a large number of remote users simultaneously while providing acceptable response times, through a network, the mainframe is unchallenged in its role. ABN, MEDLINE, DIALOG, AUSINET, I* SHARP, all run on IBM or compatible mainframes. The hardware requirements to achieve the throughput necessary for public computing differ markedly from the requirements for personal computing.

Earlier this year, and probably out of sheer bloody-mindedness, ACI conducted a series of benchmark tests comparing the speed of its mainframe with an IBM PC. For a range of typical operations (integer and floating point multiply

and divide, "do" loop execution) the mainframe was on average, more than 500 times faster than the PC. The tests indicated that PC's compared with mainframes are at a very early stage in their development.

The 3081D mainframe processes data at 10.5 million instructions per second, the IBM PC at 1-2% of this rate. The main memory of the 3081, where processing instructions are stored, has a capacity of 16 million characters. The largest available PC memory is 640,000 characters. The 3081 communicates with its disc storage subsystem via 16 separate channels, each transferring data at up to 3 million characters a second. The PC communicates with its disc via a single channel at up to 1200 characters per second. The PC has one user at a time, the mainframe can have hundreds.

The point of this comparison is that for library applications of data processing, for the management of digital data, it is very much the case of selecting the appropriate equipment for the task. For example, one would have to be a supreme optimist to attempt to mount an integrated library management package such as DOBIS, on a PC. For a start, at 640,000 characters, the PC's main memory is too small to fit the 700,000 characters DOBIS needs. Nor could sufficient online storage be attached to a PC to accommodate a large catalogue database. And even if these problems were overcome, only one user at a time could access the PC system.

Most microcomputer based information storage and retrieval systems, and there are several around at present - BRS/Search, Status-M, ICI's Homer, micro CAIRS, Sci-Mate and Golden Retriever, trade-off mainframe function against individual user convenience. And if you wish to share your micro system with other users located away from your office, networking capabilities are practically non-existent. However, this is not to say that PC's have no role in conjunction with mainframes. For preparing data for transmission to a host

system, and for downloading data from the host, PC's are flexible and inexpensive. Just don't expect PC's to be handling Medicare claims, or processing dole cheques, or consolidating banking transactions, or making airline reservations, or running the databases you dial into. They don't have the throughput capacity. And when in the next decade the so-called fifth generation computers become available - the expert systems that promise built-in intelligence to diagnose, predict, plan and design, expect them too to be running on mainframes.

TELECOMMUNICATIONS FOR INFORMATION MANAGEMENT

Telecom, with its monopoly on telecommunications recently reaffirmed, holds the key to successful access and resource sharing for libraries and information centres. New services currently being implemented contain the potential for unifying the nation's information resources, provided, and an extremely important proviso, that Telecom's move to volume based tariffs does not price high-volume users such as libraries, right out of the market.

The ownership and control issues which have exercised some of us since the domestic satellite was first mooted, have largely dissolved. Statutory monopolies granted to Telecom and OTC are considered to be worth commenting upon, but not complaining about. Business Telecommunications Services (BTS), the IBM-sponsored consortium including PBL, Ampol, ACI, AMP, BHP, CSA, CRA, IBM, James Hardie, Myer and TNT, set up in 1980 to lobby for the end of the monopoly, was wound up in June this year. Recently the Government announced, with customary mental agility, that the domestic satellite would proceed, and would be owned by the Government and Telecom in 75%/25% shares respectively. Apparently this joint venture is meant to reconcile the interests of the State on the one hand, and provide a link to the market with the other.

Telecom has an enormous investment in its current services, and for this, among other reasons has been slower to move than its counterparts in the US and the UK. There are 7.5 million telephones in Australia, all using analogue technology on a network designed for voice traffic. Now, with requirements for data transmission growing at 30-40% p.a.[16], Telecom is making haste to implement a digital network with much greater capacity than the present Public Switched Telephone Network.

From 1982 the Digital Data Service (DDS) has provided inter-capital city services at lower rates than the DATEL services it replaced. In three to four years time, Telecom expects DDS to be implemented throughout Australia. DDS can be regarded as a basic data transmission system. The International Standards for Digital Telecommunications Networks will be well on the way to full implementation by 2000AD. DDS traffic can be carried via copper wire, co-axial cable, optical fibre, microwave or satellite. It opens Telecom's options and frees it from the capacity constraints imposed by the analogue telephone system. Simultaneous transmission of voice, data and image, sharing the same bit-stream, has become a reality. There's one to ponder. So far we've become quite experienced in data transmission techniques through systems such as ABN, Medline and AUSINET. What are our requirements for the transmission of say, digitised voice, or digitised facsimile, or pictures? It is now a matter of cost rather than capability.

AUSTPAC, everyman's network, came out of the laboratory and into the market early this year. AUSTPAC is a network of communicating mini-computers, sharing a common protocol to send "packets" of information via computer-selected routes, all over Australia. At $7-$10 per connect hour for asynchronous transmission. AUSTPAC will also support synchronous transmission for applications not requiring permanent DDS circuits. Charges will be based

on type of connection and data volume, but since the service is still bedding down, we don't yet know whether libraries will find AUSTPAC affordable. Telecom intends that AUSTPAC should be everything the Common User Data Network was not: "... AUSTPAC is a response by Telecom Australia to the emerging need for a truly universal data network that can be accepted by public users, with the same ease as for the present telephone system."[17] ACI's position in relation to AUSTPAC is that it will be a useful complement to its current leased line network, providing access to public services for users beyond local call distance of network nodes. For people wanting to offer network services, but without a network of their own, AUSTPAC will provide the infrastructure at a fraction of the normal set-up costs. AUSTPAC goes commercial in 1984. Initially Melbourne and Sydney will be connected, followed by the other capitals by the end of next year. By 1986 all centres should be whipping their packets around the nation.

The domestic satellite, AUSSAT, scheduled for 1985, is a bit of a dark horse. No doubt it will be used for broadcasting to remote areas, for accepting overflow from the terrestrial network, to provide alternative routes as back-up to, say, the Melbourne-Perth link, but the system envisaged (2 satellites, plus one in reserve) will have such capacity that it will be able to support applications not yet considered. For libraries serving concentrated urban populations, the satellite is no big deal. Whether its worth using or not will depend upon the services offered and the prices asked.

Reverse or bi-directional MIDAS, is of much greater interest. After four years of gaining experience in exporting Australian dollars to offshore hosts, OTC have decided to attempt to balance the ledger. Network nodes in London, Los Angeles and Singapore have been installed already, Tokyo is scheduled for next month and Auckland in April 1984. Reverse MIDAS will provide a packet-switched telecommunications link for people wishing to dial into

Australian services from these five countries, and, it is hoped, will do so at rates considerably better than the current prohibitive ISD rates when used for data transmission. $20 - $30 per connect hour looks likely - still dear by comparison with the US networks, but much better than ISD. And in case we should run away with the impression that OTC has at last decided to raise most of its revenue outside Australia, its recent announcements on the MINERVA electronic messaging/news/retrieval system, running on ITT's DIALCOM system in the US, should place its priorities back in perspective.

INFORMATION MANAGEMENT AND OFFICE AUTOMATION

Office automation, with its emphasis on computer systems for managing text and numeric data is very close to what we generally understand as information management. Word processing is the heart of office automation, and because of its success in improving productivity, has become the spear-head for a host of other products integrating the management of text with data, voice and image.

Now, the improvements in price/performance of office technology, the wide availability of software, and the increasing importance of access to information generated outside organisations, plus the marketing push of some of the world's most influential companies, have made it obvious that the next phase of office automation is well under way.

With widespread adoption of word processing and increasing acceptance of electronic mail systems, many clerical functions have been successfully automated, and the purveyors of office technology are turning their attention towards managers and professionals - the so-called "knowledge workers". And dealing directly with knowledge workers is a new challenge for two major reasons:

- Unless office systems are simple and easy to use, managers won't use them. And the data processing industry has shown a marked inability to design "user-friendly" systems. So more recently we've seen "professional workstations" operated not through keyboards, but through the selection of symbols controlled by touching screens or moving various hand-held controls, and its a fair bet that systems based on voice recognition are not too far away.

- although it is generally agreed that productivity gains will be particularly significant for managers since they are so costly, "... no one really understands how managers work or make decisions nor is anyone certain what increased manager productivity really means, or how it can be increased."[18] Speeding the flow of paper, or speeding the flow of information by substituting electronic information for paper, is really only stepping up the pace of existing operations - not introducing qualitative improvements in the performance of knowledge workers.

So it does seem that the next step in office automation, probably to integrated multi-function systems comprising uniform command structures for database management, electronic mail, graphics, spreadsheet analysis, time management, access to external databases and encryption and other security features, will require a deep breath. It also seems that this step will be taken soon. Function is becoming more important than price.

And for information managers, there will be a whole new range of tools. Wang, the company that owns the electronic rights to Roget and the Oxford English Dictionary[19], has just announced its Professional Image Computer. This system, costing around $30,000, removes most of the need to physically handle

documents. Made up of a microcomputer, a scanner and a printer, the Wang system can be used to capture visual data, convert it to digital form, edit it, merge it with word processing, store it, retrieve it, and transmit it.[20]

Image processing is the significant breakthrough. As word processing and image processing are blended by microcomputing the range of tasks that can be performed by the information manager increases dramatically. No longer confined to information that can be represented in type, the possibilities for new kinds of information systems are well worth investigating by library and information workers. Both from the point of view of improving managerial performance, and from the point of view of developing new types of services integrating all types of information. Speculation on new applications in the latter category should occupy a conference all of its own, and no doubt this item will loom large on VALA's 1985 programme.

As a final comment on productivity potentials in the office, consider this: capitalisation of farmers averages $35,000 per head; capitalisation of factory workers averages $25,000; but capitalisation of office workers averages $2,000.[21]

PERSONAL COMPUTING FOR INFORMATION MANAGEMENT

The International Data Corporation estimates that by 1986 every American above the age of five will have access to some form of computer - most schools have them and libraries are beginning to rent them. IDC also suggests that by 1986 one in three Australian homes will have a personal computer.

Software is the key to success in personal computing and estimates are that some 30,000 separate packages are available. The main application areas in

preference order are word processing, financial analysis, accounting, database access, personal record keeping, graphics, games and engineering and scientific computation.

Visi-Calc, the most popular electronic spreadsheet package, is reported to have sold 600,000 copies since 1979,[22] and Lotus 1-2-3, a multipurpose package combining spreadsheet, graphics and a database management system, has sold 110,000 copies since it was introduced to the market in January this year.[23]

The evolution of the personal computer from an entertainment machine to a multi-purpose processor is well under way. And at the same time the orientation and motivation for purchase is changing from amusement to data processing.

Of the personal computers sold by ACI, and, it should be noted, sold mostly to companies, roughly half are sold with some form of financial modelling or spreadsheet software, one third with word processing and one quarter with communications capability. Database management systems are also popular. Statistics, accounting, time management and educational programs account for most of the balance.

Until the release of the $700 PC jr. next year, IBM PC's come in two flavours: the PC and the PC XT. Since the XT can store on disc up to 10 million characters it can be quite useful for creating, maintaining and searching internal databases, and many of our customers do this, some of them also transmitting databases or updates to databases from their PC's to our mainframe for public reticulation through AUSINET.

In addition, many libraries, particularly in the US are buying packaged software for library management tasks such as circulation, acquisitions and

serials check-in. Often libraries are using PC-based application generators and software productivity tools to write their own applications. A new journal Software Review (ISSN 0278-2634) endeavours to keep track of a steady stream of microcomputer software specifically for libraries.

Micros are such convenient machines. You can buy one from a department store, along with packaged software, take it home, plug it in, load the diskettes, and begin building your own database - all before lunch on a wet Saturday morning. You don't need experts in systems or applications programming - just an interest and a willingness to spend something around the annual depreciation on the family car. "Personal computing" is a particularly apt label. It is computing at the personal level, for all people with the interest. It is, if you like, popular information management. And it is increasing in popularity at a remarkable rate: worldwide, one million PCs in 1980, 13 million in 1983, 24 million in 1984 and 81 million by the end of 1987[24].

Once all those users have exhausted the repertoire of operations on their own data, they'll be looking to libraries and information services to provide access and external data services from an almost infinite variety of sources.

INFORMATION RETRIEVAL SYSTEMS

In the area of information retrieval systems there is not a lot in the way of new products - other than the addition of new databases. The total number of online databases, factual and bibliographic, is now believed to be around 1700.

In the US, probably around 75% of the total market, the big became bigger and the small have to search even harder to find profitable market niches.

According to a rerent surrey Dialog and Mead accounted for 80% of total revenue and 68% of usage. Together with BRS, SDC, NLM and the New York Times (now part of Mead) the six services accounted for 90% of revenue and 96% of usage. Just three databases, LEXIS, MEDLINE and Chemical Abstracts generated around 50% of total revenue and 50% of total usage.[25]

Yet another study showed that for the period 1981-2 online delivery of information grew fastest of all delivery methods, including print, microform and personal contact. In terms of sales revenue printed products outsold online services three to one, but the growth in online services is three times that of print media.[26]

The average penetration of online services was estimated as 10-15%,[27] so it seems there is plenty of room left - even for existing services, let alone the ones to come. Table 1. shows sources of revenue for the largest single market.

NORTH AMERICAN ELECTRONIC INFORMATION INDUSTRY

REVENUE SOURCES BY MARKET - 1982

MARKET	% OF TOTAL REVENUE
Financial	29
Credit	20
Economics/Econometrics	9
Legal	9
Scientific/Technical	6
News	3
Real Estate	3
Specific Industries	3
Libraries	2
Product Monitoring	2
Audience Measurement	1.5
General Business/Industry	1
Government	1
Consumer	1
New Professional Services (doctors, farmers, chemists)	1
Demographics	.5
	100%

TOTAL REVENUE: US$1 Billion

SOURCE: International Data Corporation, 1983.

TABLE 1.

Table 2 provides a broader perspective, showing estimated revenue and estimated customers for all sections of the information industry, including information retrieval services.

It is probably worth observing that the Australian market for online information services is probably worth $4 - $5 million at present - much less than one half of one percent of the international market and in total, accounting for less revenue than the National Library of Medicine's Medlars Services.

INTERNATIONAL ONLINE INFORMATION INDUSTRY

ESTIMATES OF TOP 25 COMPANIES BY CUSTOMER/REVENUE - 1983

	COMPANY	SERVICE	EST. REVENUE	EST. ACCOUNTS
1.	Dow Jones	News/Retrieval	43 Million	100,000
2.	CompuServe	CIS	5 M	75,000
3.	Quotron	Financial Service	113 M	58,000
4.	ITT	Dialcom	65 M	45,000
5.	CDC/Readers Digest	The Source	4 M	40,000
6.	Reuters	Monitor, etc.	310 M	32,000
7.	British Telecom	Prestel	9 M	30,000
8.	Equifax	Financial Control	67 M	30,000
9.	Lockheed	Dialog	58 M	26,000
10.	Bunker Ramo	Market Imp./Quotes	64 M	25,000
11.	Chilton Corp.	Credit Reporting	75 M	12,000
12.	PRC Realty	Multiple Listing	50 M	12,000
13.	Exco	Telerate	20 M	1[illegible],500
14.	Agridata	Agristar	7 M	11,000
15.	Dun & Bradstreet	DunSprint	83 M	10,500
16.	Knight-Ridder	Commodity News	26 M	9,300
17.	BRS	BRS/Search	10 M	8,700
18.	IP Sharp	Sharp APL	12 M	6,500
19.	General Electric	Mark III	12 M	6,000
20.	SDC	Orbit	10 M	6,000
21.	Official Airlines Guide	OAG Electronic	10 M	5,700
22.	Mead Corporation	Lexis/Nexis	90 M	5,500
23.	OCLC	OCLC	25 M	5,400
24.	Control Video Corp.	Gamaline	10 M	5,000
25.	National Library of Medicine	Medlars	7 M	3,500
			1,185	574,600

MAIN SOURCE: IDC, 1982, IDP Report October 1983.

TABLE 2.

But that's not to say that not much has been happening here. Since the 1981 Conference AUSINET has added new bibliographic, factual and full-text databases in engineering, water resources, leisure, statistics, business, transport, educational research, and next year will mount files on oil and gas exploration, family studies, taxation, visual arts, medicine and accountancy. In addition a new service, ACIMAIL, provides electronic mail facilities for AUSINET searchers wishing to order documents from database suppliers.

Over the same period, and often with gritted teeth, the National Library has made solid progress in extending the benefits of ABN. And the National Library's MEDLINE service has continued its steady growth.

The disappointments of the past two years, in terms of public systems, have been the slow implementation of legal retrieval services, the termination of the Australian Science Index, and further delays in the implementation of CSIRO's on-line network. The Commonwealth Parliamentary Library system has also been slow to start.

Overseas, BRS, Lockheed and SDC have implemented simplified versions of their prime time systems, aimed at the home computer and terminal market. No usage figures are available yet, so it is difficult to comment upon this venture into the domestic market. But Lockheed seems to be covering most possibilities by re-writing DIALOG along database management lines and adding electronic mail, conferencing and electronic delivery of print and search results.[28]

For Australian consumers of information services the supermarket of services is becoming a "hypermart," with Australian databases becoming an increasingly important sub-set. Growth in the number of bibliographic databases appears to

be slowing, but the development of factual, numeric and full-text files is proceeding apace - aided by wider access to communicating word processors and personal computers with telecommunications capability. And from my own point of view it is particularly pleasing to note that AUSINET, after nearly six years of service, passed into profitability around its fifth birthday.

Issues on the horizon are downloading of databases (I wish there was as much interest in uploading), trans-border data flow, privacy and security.

VIDEOTEX

It used to be said of videotex that the only people who made any money from it were those writing market surveys. Now it seems that the Cinderella of information technology has found her slipper and is heading back to the ball.

In Australia, Control Data and ICL are offering bureau services, and specific, usually closed user group services have been implemented by The Age, GMH, Volvo, CAS for the Australian Federation of Travel Agents, Jetset Tours, Victorian Department of Agriculture, WESTPAC (with the ex-Myer Telidon system), the World Trade Centre in Melbourne, Prudential Insurance, Elders-IXL and Qantas. Channel 7 and Control Data are also reported to be working jointly on an interface between videotex, the two-way telephone medium and teletext, the one-way broadcast medium. Put this activity together with Telecom's recent approval to offer a full-scale Prestel-based service, and it does seem that at last the consultants have some competition for the videotex dollar. At home the debate is joined on the topic of whether Telecom should support not only the alphamosiac graphic system (Prestel), but also the North

American Presentation Level Protocol System (Telidon and Antiope) with their enhanced alphageometric graphics. With British standards being used in 98% of videotex and teletext systems throughout the world,[29] it seems unlikely that Telecom will bow to private sector pressure.

Internationally, there are supposed to be more than 2.25 million videotex and teletext sets in 26 different countries. Almost half the sets are in the UK, with a quarter of a million each in the Netherlands, West Germany and Sweden. The British claim that the French have 1.2% of the world market, and the Canadians 0.2%.[30] Presumably these figures exclude the 300,000 Minitel terminals ordered for the French Electronic Directory Service, Teletel.

I think it worth commenting upon that unlike online information retrieval systems, it is unlikely that videotex would have reached its current developmental stage, had it not been for government encouragement by the British, Germans, French and Canadians. In the US, where no government support was involved, videotex is still in its infancy. Perhaps this reflects the conservatism of commercial enterprise? Or merely indicates that videotex appears a classic case of technology push rather than market pull.

The big advantages of videotex over online retrieval are that it usually employs a simple hierarchical approach to stored information, and that the equipment required to use it, a telephone and a TV set, is already in place in most homes. The main disadvantage is the same as its strength. Designed to be simple to use it lacks the refined selection mechanisms of the online services, especially when the database grows beyond a couple of thousand records.

Nevertheless there are some very interesting applications:

1. In Norway the Datafreight service for road transport provides market information for suppliers of goods and allows hauliers to view their options and co-ordinate pick-ups and deliveries.[31]

2. In Britain the Prestel Skytrack service connects the videotex system directly to airlines' computers for online reservations.[32]

3. A British company, Data Ltd. offers the Antiques Register Service covering 9000 dealers and auction houses. Subscribers can offer their stock online and leave on file descriptions of items sought. Prices and valuations are constantly updated and the service operates 24 hours a day with direct debit banking.[33]

4. In February this year Prestel arranged an electronic opinion poll during a live TV programme. Viewers could choose the ending to a drama involving the eternal triangle by answering key questions. In minutes the most popular ending was identified (more sex please, we're British) and then enacted.[34]

5. The Canadians are proposing Fishnet, a service to provide Atlantic fishermen with information about fish stocks, prices and regulations. Also coming up for Telidon are an electronic journal for the handicapped, an advertising system with touch-sensitive terminals and large screen displays for shopping centres and public places.[35]

Videotex services now seem to be entering commercial viability, not of their own accord, but because market trends towards home computers and VCR's have provided an introduction to the technology and the wherewithall to connect to it. In Australia, an unbridled Telecom seems likely to offer a range of attractive mass market services at precisely the time that home computers and videotex terminals are merging into the same devices. Commercial opportunities for videotex, for my money, lie in the degree of programmability different software will support. Volvo has already implemented a videotex gateway to a mainframe running a spare parts inventory. Online livestock auctions are another potential application. For libraries, videotex offers the chance to contribute to the public store of information, and also to tailor services through AUSTPAC to specific user groups.

CONCLUSION

Well, were to from here? We've romped through information technology, practically all of it developed overseas. Time to get our hands dirty?

Despite the best efforts of the library schools, particularly RMIT, CCAE and the UNSW, we still have no formal courses and no institutions devoted specifically to the information management aspects of information technology.

Dissatisfied with the curriculum of library schools, and determined to establish a flourishing information industry, the Commission of the European Communities is setting up an Institute for Information Management to produce highly qualified managers to support and develop information technology in Europe.[36] Courses will cover, among other things, hardware, software, telecommunications, the economics of information systems and the commercial

role of information. Funding has been made available (around $1 million) and the first enrolments are being sought. Couldn't we pinch another good idea from OS? If Justice Kirby can call for the establishment of a school for judges, why not a school for information managers?

Finally, lest you consider me an apologist for inappropriate technology, an undiscerning ambassador for the foreign policy of the trans-nationals, I would like to close with a quote from Maurice Line's paper to IFLA 1983. It summarises the main point I've been labouring to establish.

> "It is possible to fantasize about the future at any length, and much literature on the so-called paperless society should be regarded as interesting speculation - library science fiction, perhaps - rather than accurate prediction. It is as easy to construct in imagination an Information Armageddon as an Information Paradise. Most worrying are those writers who believe that because something can be done it will be done and should be done - a sort of technological imperative. There are many things that technology can do that should emphatically not be done. We should get our priorities right. By all means let us consider what technology can do, but let us consider also what we want to be done, whether technology can help us to do it, and what other consequences might follow from the application of technology to an apparently good end. Our interest should be not so much in what is technologically possible, but what is desirable, practicable, sensible, economic and humane. If the pursuit of certain lines of action is likely to lead to undesirable results as well as possibly useful ones, it needs to be considered whether the good outweighs the bad or vice versa. Librarians should be neither enthusiastic and uncritical supporters of all applications if IT, nor should they be passive and helpless observers: they should become involved and seek to influence events."[37]

REFERENCES

1. Popper, Peter. Information in Wonderland: March Hare or Queen of Hearts. Electronic Publishing Review, Vol. 3, No. 2, 1983. p.147.

2. Telecom Australia. Commercial Services Department. Message Services Network Discussion Document. Melbourne, September 1983.

3. Electronic Publishing Review, Vol. 3, No. 2, 1983. p.92.

4. Electronic Publishing Review, Vol. 3, No. 2, 1983. p.iii.

5. Online Review, Vol. 7, No. 5, 1983. p.364.

6. Electronic Publishing Review, Vol. 3, No. 2, 1983. p.89.

7. Backer, David S. Personalized videodisc systems: a prototype for an electronic book. In: Proceedings of the Tenth Australian Computer Conference, Vol. 1, Melbourne, 1983. p.80.

8. IDP Report, November 11, 1983. p.6.

9. Monitor, June 1983. pp.1-2.

10. Online, September 1983. p.124.

11. Rydges: In Marketing, October 1983, p.21.

12. The Home Market: An Overview of Opportunities for Micro Software and Service Suppliers. International Data Corporation, July 1983. p.19.

13. IBM PC Expansion and Software Guide, Second edition, QUE Corporation, Indiana, 1983.

14. The Macmillan Treasury of Relevant Quotations, London, Macmillan Press, 1980. p.377.

15. Industries Assistance Commission. Discussion Paper on New Technology and Industry Assistance, Canberra, 1983.

16. Harrison, M. John. An overview of AUSTPAC - the Australian packet switching network. In: Proceedings of the Tenth Australian Computer Conference, Vol. 2, Melbourne, 1983. p.661.

17. Ibid, p.653.

18. Grant, Bob. Office technology - technology in search of an application? In: Proceedings of the Tenth Australian Computer Conference, Vol. 2, Melbourne, 1983. p.823.

19. VideoPrint, International Resource Development Inc., Connecticut. Vol. 4, No. 15, p.11.

20. Australian Business, November 16, 1983. pp. 39-42.

21. Eres, B.K. Information technology: status, trends and implications: Part 1. Electronic Publishing Review, Vol. 3, No. 3, 1983. p.223.

22. IDP Report, October 14, 1983. p.7.

23. Ibid.

24. The Home Market, op. cit. p.19.

25. IDP Report, September 30, 1983. pp.1-2.

26. IDP Report, November 11, 1983. pp.1,5.

27. Online, Vol. 7, No. 5, September 1983. p.9.

28. IDP Report, October 14, 1983. p.1.

29. Electronic Publishing Review, Vol. 3, No. 3, September 1983. p.172.

30. Ibid.

31. Ibid.

32. Ibid. p.173.

33. Ibid. p.180.

34. Electronic Publishing Review, Vol. 3, No. 2, June 1983. p.103.

35. Ibid. pp.102-3.

36. Online, Vol. 7, No. 5, September 1983. p.125.

37. Line, Maurice. Some Possible Future Effects of Information Technology. Paper delivered at IFLA General Conference, Munich, August 1983. p.9.

SCHOOL LIBRARIES AND COMPUTERS - Paper to be delivered at VALA conference, 7th December, 1983.

By Kate Alder.

When I was asked to speak at this Session, and was told that the day's title was "Local Aspects" and that I was to outline for you some developments in school library automation, I thought that it was a great idea to have school libraries included in your review. However one thing worries me about the title "Local Aspects - School libraries", and that is that it doesn't seem to contain any acronyms! But, wait a minute...I think that I can spot an acronym, so don't worry, the great library automation acronym tradition will yet be upheld. Here is today's acronym ~ ...L.O.C.A.L. It stands for .Learning
.Outside-contacts, and
.Control of resources, via
.Automation of
.Libraries

I will deal with these three areas of computer use - computer-assisted Learning, using computers to open up resources outside the school, and controlling school resources, in turn, and give you some examples of School library developments in each area.

The first role in which computers are being introduced to school libraries is that of assisting student learning. The four areas I want to mention are:

(a) the library as a venue for providing ready and equal access to computers for all students, for the use of such educational software as training packages, drill and practice, simulation programs, and games for literacy and numeracy.

(b) the library as a provider of facilities and education for students so that they can gather and process their research more effectively. This includes activities such as students setting up their own databases (using such software as FACTFILE) and doing their own wordprocessing (using software such as BANK STREET WRITER).

This area of computer use is becoming important even in primary schools. Using the computer to assist in collating and presenting their information means that students are not tied down by the mechanical constraints that make research for children a painful process. It frees them for the important tasks in research like considering the selection criteria for their information and the relevance of what they have found.

It is thus an area of computer use that I hope school libraries will promote more.

(c) the library as an access point for the increasing amount of information that is published in machine readable format. Some examples are the First Fleet database published as part of Information Technology Week 1982, and the Antartic database soon to be released by the Commonwealth Department of Science and Technology.

(d) in future, the library as an introduction point for new ways of data-handling by computer. Two examples of new information-handling software for microcomputers could be:-

(i) the MICROPROLOGUE programs now available, which enable students and teachers to combine information and rules of logic to provide complex information services, and

(ii) the developments in providing fiction reading via computer which were forecast by Ian Webster in his talk to the IBBY conference on "The Story and Technology" in Sydney in August.

Such developments as this, where students can combine on computer many different characters, plots, settings and endings could be very stimulating but they do challenge librarians' notion of the fiction experience for readers, and of how fiction material is handled in the library. For instance how do you assign subject headings to an ever-changing story, and how do you assess the literary merit of such experiences using our traditional criteria?

In these four areas I have just mentioned in which the library is becoming involved in computer-assisted learning, it is vital that computers are available in the library for some or all of these curriculum-support functions, for the following reasons.

(a) it is important that all students have equal access to computing facilities, and the library is one place in which this can be managed.

(b) librarians have much datahandling expertise which should be available to the school as more studnets move into handling their information on computers.

(c) librarians are in danger of being bypassed as the acquisition of computers to support the curriculum proliferates in other areas of the school.

However all this use of computers to support the curriculum does take funds, and librarians will be tossing up whether the scarce computing power available to them might not be better used to assist library administration. A philosophical dilemma, no less!

The next major function of computers in school libraries which was listed in our acronym (L.O.C.A.L.) was the facilitating of Outside-contact. This means expanding the resources that are available to the school beyond the walls of the school. There are five areas in which this is happening, or will happen.

(a) The resource of having a wide range of cataloguing records made available to schools from a national database will become a reality in 1984 with the beginning of the service from ASCIS, (Australian Schools Cataloguing Information Service). From mid-1984 cataloguing information will be input by some states and made available to all states in the form of card sets, microfiche or magnetic tape. Tenders for the computer system are now being considered.

It is likely too that teacher-librarians will become more involved in the use of ABN services, possible through some sort of future link between ASCIS and ABN. I think teacher-librarians might find the idea of dealing directly with ABN somewhat forbidding both from the aspect of cost and the sophisticated layout of the cataloguing record, which would hardly be suitable for your average school library user. However ASCIS may be able to act as an intermediary, stripping down the records for instance.

With ASCIS school libraries can expect a rapidly updated and comprehensive supply of cataloguing records, with on-line access to the database a quite probable future development.

(b) The task of giving schools better access to curriculum documents produced elsewhere in the educational system could well be aided by some sort of central computerbased database. We can take some encouragement from three possibilities now emerging.

(i) In Victoria proposals to use some of the Education Department's central computing resources to provide schools with a curriculum document database are currently seriously being considered. It is hoped that if other states have similar databases that they can be accessed also, although problems of copyright and ownership will have to be addressed.

(ii) As mentioned yesterday, the Australian Education Index is to include curriculum policy statements and like material in its database in the near future.

(iii) The Australian Beginning service, which allows microcomputer users to dial into information services, is increasingly being subscribed to by schools. This could be a useful medium for the swapping of curriculum documents and units of work between schools who are members.

(c) In the area of using computers to maintain union lists of groups of schools' holdings, there are now many local developments. Kuringai CAE did some pioneering work in offering its computing facilities to local clusters of schools to produce union lists of scarce resources such as periodicals and videotapes. Schools' microcomputers are now often used to produce union lists, such as with the ACCESS EAST network of ten schools in Melbourne's eastern suburbs. There is still however much work to be done in increasing schools' knowledge of other holdings, and perhaps ASCIS might in future be involved in addressing this problem. Then there is of course the problem of convincing school personnel of the desirability of sharing resources once located. But that's another problem, and one not so susceptible to a computer solution.

(b) Access for schools to services such as on-line data bases providing bibliographic citations is gradually increasing. Services such as AUSINET are now available to schools through some public libraries, such as at Box Hill in Melbourne, and through central libraries in State education departments. The on-line costs are the major prohibiting factor on schools directly accessing services such as AUSINET at the moment, as many now have equipment that could be used as a terminal.

(e) A trial has recently been concluded in South Australia of the VIDEOTEX information services in 15 schools. The report is now available from the Educational Technology Centre of the South Australian Education Department.

To sum up this area of computer use, that of putting the school in touch with outside resources and information, most of the developments in this area are tentative and experimental. Many school personnel are wary of the notion of sharing resources and equipment, as they believe that schools need to be able to respond immediately to staff and student needs,

and resources must be available in-house. However school administrators are, I believe, increasingly supportive of attempts to link information services with the outside, and to devote funds to computer support to do this. They are aware that the curriculum continues to broaden in scope despite some community pressure for its contraction, and at the same time the financial resources available to each school to meet information needs continue to contract.

You may recall that the last of the three main areas of computer use for school libraries that was listed in our acronym was "C" for "Control of Resources" so it is to this area that we now turn.

By control of resources I mean all those functions that contribute to making the library's collection available to users - including acquisition, cataloguing, circulation and accounting. There are two approaches that can be taken, one being to use computing resources within the school to do some of these functions, and the other being to support such functions by computing power from outside the school. The approach taken very much depends on which state is involved, and I will deal firstly and mainly with the 'in-school' projects, as this is what has prevailed in my own state of Victoria.

1. In-school projects.

(a) The most common starting point for those who want to harness the computer to help control resources is to use the schools's microcomputer for the easy production of printed lists. Thus many small computers are currently producing lists of videos arranged by subject headings, or lists of overdue books arranged in various ways, or small bibliographies. Some libraries have gone onto producing orders, and then accounts and budget reconciliations from the same input. One example of this type of use is at Morwell High School.

Typically, the hardware looks like this:

48K-64K 8-bit microcomputer	100K - 1,000K + storage on diskette + printer	database software, e.g. + BROAD,PFS,D-BASE II

(b) Circulation systems (and/or computer-based catalogues) are the next step usually. The same type of microcomputer can be used, often with the addition of a barwand. The software used includes the dedicated packages available from Richmond Microsoftware, Lothlorien, and Cybertech Developments, and programs are also used which have

been written using a software program like D-BASE II. Some examples of applications in Victoria include Carwatha High School, Blackburn Technical School, St. Kevins' College, and Whittlesea Technical High School. St. Pauls' College, in New South Wales, is another example.

(c) And just to show that school libraries are not all that far behind I would like to add some more examples of Public Access Catalogues to Tony May's list. There are at least four working examples in Victoria in schools, and more in the pipeline. Some examples are at Colac Technical School, which has a linked circulation system, and Hamilton and Mildura Technical Schools. All these libraries use a 64K computer and Hard Disk storage, and access for users is catered for mostly by the use of the printed catalogue.

The typical set-up for such an automated catalogue would be a 64K - 128K computer, with hard disk storage and printer, with the use of software such as MICMARC (from Cybertech) or a program written using D-Base II. An interesting on-line catalogue for primary school students is in use at Warragul Primary School, where an Apple computer, with hard disk attached, is consulted by students doing a subject search.

While commenting on on-line catalogues as part of 'in-school' systems, I should mention that school libraries are presented with the same dilemma that we have heard many other libraries have faced. That dilemma is - "Home-grown" or "Commercial" software? Some schools have chosen to write their own programs using BASIC or D-Base II, because the costs are much less, because programs can be easily integrated with those already written in the school for administration, and also programs can be easily changed within the school to meet changing library needs. On the other hand schools that have bought software from companies say that the advantages of not having to work with the complexities of designing library automation systems, and the availability of back-up services and help with record conversion, are major reasons why they have not used software written 'in-house'.

2. Larger-than-one-school projects.

Very little has been done in Victoria with this notion that school library automation could be achieved by means of shared use of a system. However there are some developments that I am aware of that should be mentioned, as they may point the way for more shared developments.

1. In Tasmania, schools have had on-line access since 1978 to bibliographic

data for cataloguing from the Elizabeth computing centre in Hobart. All 120 High Schools there are now users. In addition to this service, called TASCIS, 7 High Schools are provided with an on-line circulation system called CIRCYS, which also facilitates resource management. An integrated central database is now being set up which will provide Tasmanian schools with circulation and user enquiry facilities from the one system, called TBIS. Information provided upon a subject enquiry will range from the schools' holdings on a subject to those of government agencies and other libraries.

2. Some school libraries are fortunate to be members of library systems that have computerised. Two examples are Coburg High School, which is linked to the URICA system at Preston TAFE for its TAFE night classes, and Gladstone Park High School, which as a community library is part of the LIBS-100 system at the Moonee Valley Regional Library. While these examples are interesting there are not likely to be many schools that are offered a similar chance to computerise that way. We will have to look elsewhere, I think, for assistance for most school libraries.

3. This brings me to joint-ownership projects. There are no such projects between schools that I know of, but the trend to clusters of schools could encourage, say, a shared system between schools. Two interesting projects are currently being mooted in Victorian country towns to help school and local libraries take advantage together of automation and resource-sharing. School and public librarians are planning the INTERLINK project in Ballarat, and in Swan Hill they are also looking to share some sort of integrated system, as the Public Library is likely to computerise in the near future. We look forward to hearing more about such projects.

To sum up this third section of the paper, on using computers for Control of School Resources, I think that you could say that the emphasis in Victoria is on local, 'in-school' developments. It may be useful background for those not in schools to explore why this is so, so I will just speculate on what I see as some reasons for a moment.

(a) There is often a need or an opportunity to use existing equipment in the school.

(b) Due to the way many schools, in particular government schools, are funded, money is never available in large chunks. Thus if a school was to be invited to join a system which required a large input of capital initially and then showed cost savings over a long term,

that large chunk of capital may simply not be available even if a good case can be made to say that joining a shared system would save money!

(c) Fund-raising for computers is often mainly through local initiatives by students, parents, and teachers. They prefer to see the money from their labours spent on computer power that will be available very largely to that school.

(d) There is often a concern to automate student records and school financial records, with the library system seen as fitting in this with this automation project, and sharing its computing power rather than sharing computing power with another library.

(e) In government schools, expensive systems or systems that require a large initial input of money often cannot be argued for on the grounds that there will be staff-cost savings, as the staff numbers are fixed anyway and not related to any level of automation. Thus if schools want to automate they have to look to cheap equipment, and hence in-school microcomputer based libary systems have arisen.

(f) A major requirement for school library users is to be able to see at first glance what the holdings of that school are, with enquiry as to other resources made at a later stage. Thus personnel in schools are a bit wary of shared systems if they feel that there is a possibility that users may not be able to see only the schools' own bibliographic records as a result of a search of the shared on-line or printed catalogue.

(g) School librarians are also wary of becoming members of systems that do not seem to guarantee a high degree of individuality for member libraries, as schools vary greatly in the sort of services they require from their library.

(h) Teacher-librarians are often members of a library staff of one or two. They would find it was difficult to leave their libraries to become involved in the large amount of planning and consultation that would be involved in sharing automation with other libraries. I think that they also lack the confidence, in some instances, to become involved in such projects.

With the trend at the moment being to establishment of in-school library automation systems, are we going to be able to achieve all three of our aims in introducing computers - Learning, Outside Contact and Control of Resources? We realise that in order to do all these things schools will have to co-operate

with each other and with other types of libraries, and we look forward to being able to build networks with other libraries. The pattern may be that many of the Control of Resources functions will be done in-school, and also the provision of learning tools, while some Learning tools and all the Outside Contact is provided through a variety of networks which will evolve to meet the needs of the growing number of libraries using computers.

To sum up, we will thereby achieve Learning, Outside contact, and Control of Resources from Automation of Libraries (L.O.C.A.L.) with an approach that is local, but not too local!

Well, that may sound like a tall order, but there are a few other things that I think school librarians would also like to see happen as computers are introduced into school libraries. I thought I would just mention two of these things to you as a wider group of people interested in library automation, as you may share similar concerns or be able to help us.

(a) There is very little coverage of school library automation developments in the relevant literature or indexing services in Australia. I'm sure this has to do with the bashfulness of the computer-innovators in schools, who feel needlessly self-conscious about the shortcomings of their home-grown systems, or the fact that they have gained their expertise only 'on the job'. It is also a problem in that where material is written up, it is often only in local newsheets that are never indexed. This is a problem which I would like to raise with the library community outside schools. Of course, I should congratulate VALA at this point on its recognition of school libraries in the conference program, I would also mention the bibliography on computers in school libraries by Joyce and Clyde (in Journal of S.M.M.A.R.T.,82/83) as a useful tool.

(b) As educators, teacher-librarians do not want to lose sight of the library's role in assisting users to become more independent learners. We hope that when library systems are being designed for public use, that the role of any computer system, in educating and developing independence in users is not ignored. In practical terms this would mean that sophisticated search methods such as Boolean searching are not left out of public access sytems if they would help users to get what they need, but that users would be educated in their use.

Whatever the library, I would suggest that the Educative function of the computer-based system should be considered right up there with those other important "E"s - Effectiveness of Retrieval, Efficiency, and Economics - when library automation is being planned.

TECHNOLOGY, LIBRARIANSHIP AND INFORMATION MANAGEMENT

by

Elizabeth Morrison,
Graduate School of Librarianship,
Monash University.

Abstract

Discusses some of the problems for librarians and more particularly for library educators of accommodating to both the traditional discipline of librarianship and the emerging field of information management.

I want to proffer some comments on how I, as an academic and library educator, continually try to understand the effect of technological developments on librarianship. Attempting to understand is the only way I can begin to come to grips with the concerns that are my bread and butter. My opinions derive more from experience than reading in librarianship - though I have gained some insights from history (people and technology have been around for a long time).

While I'm discussing librarianship in general and as professed in all types of libraries, large and small, I am consciously so doing within an anglophone frame of reference, with an Australian focus, and some of my comments refer particularly to libraries for the public. I am leaving aside much that is relevant in the field of documentation, "STI" and information science, partly because time does not avail, but especially because it is librarianship that I am primarily engaged in teaching and with which I have the greater worries.

The question that has exercised me in relation to teaching newcomers to the discipline and profession of librarianship is : how to help them understand what is happening in librarianship in relation to the wider world? How to help them understand, and what to teach them to do that won't be obsolete in three to five years? How much to stick with the Gutenberg paradigm, now so clearly delineated and fleshed out - the world of bibliographic networking, distributed processing and resource-sharing built up from a foundation of institutional arrangements for keeping and using printed and published books? What shift to make to devoting attention to the relatively fluid and confusing state of affairs characteristic of the communication revolution now starting to be effected through the computerisation of text?

Anthony Smith, in Goodbye Gutenberg[1], identified three revolutions in human communication. First, there was the invention of writing, in the dim past, and the story of the effect of its recording technology on the records and their management has its own recondite fascination. Second, to advance by millenia, in the fifteenth century, in Europe, there was the development of the technology of

printing from movable type - with the simultaneous production of numerous copies supplanting if not entirely replacing the slow transcription of single copies of manuscript. In due course, the discipline of librarianship developed, centred on if not exclusively devoted to printed and published books.

Now, in the late twentieth century, we are seeing, increasingly, textual matter being prepared and stored using computers. We are not sure, yet, what to expect and recognize as normal products from computer processing : it is too soon to discern the space-age equivalent of types and patterns of publication.

Of course librarians are aware, in general terms, of this phenomenon. Consider the graphic suggestion of the 1984 LAA/NZLA Conference poster - a spiral of books coming out of a black vortex and rising up into the back of a VDU. But they don't have any quick fixes. There aren't any.

Most delegates at this conference profess to be librarians; a few, more in line with the conference theme, call themselves information professionals (or information brokers, managers, scientists, specialists ...). As I think now, I cannot accept that traditional librarianship can be smoothly and easily transformed into or subsumed by information management if, or rather, when that discipline and profession forms itself. Some librarians may make the transition, but that is another matter.

A revolution is taking place, and a paradigm shift is involved. Thomas Kuhn, in the second edition of his much quoted The Structure of Scientific Revolutions, gives a postscript definition of paradigm as "what the members of a scientific community share, and, conversely a scientific community consists of men who share a paradigm."(2) Kuhn's conceptualising of the history of changing world views helps me to handle changes in my own field of study. I find him worth re-reading for his exposition of how paradigm shifts occur when theory no longer matches empirical data (when, for instance, arrangements for bibliographic control break down in the face of the facts of electronic

publishing), also worth looking at again for his description of what happens to those who cling to older views, and for his characterisation of pre-paradigmatic states - nearly random fact-gathering of data ready to hand, no consensus, no organising principles; and so often observable in discussions of state of the art information technology.

People calling themselves information professionals are herding together into a community : do they know, yet, what paradigm they share? Or, in old fashioned terms, from what body of theoretical and empirical knowledge they derive their special expertise? I don't though I'm working on it.

The implications of the computerising of text were not obvious when library automation began. It was exciting to me, when, in the late sixties, computers came into increasingly widespread use for bibliographic processing in libraries - for the "housekeeping" tasks. Bringing in systems theory enabled one to make sense of a clutter of accumulated conventional wisdom - and to dispense with a good deal of it. The explicit use of the systems approach as an organising principle in curriculum and course planning has been invaluable. It is the conceptual tool I urge students to use in the problem-solving which I see as essential to their learning.

Adjusting, over fifteen years, to developments in networking, to the technologically-supported arrangements between libraries, has been demanding, sometimes difficult, but not basically disorienting. The theory of national networking and resource-sharing, with reference to the long-term goal of universal bibliographic control (UBC) in support of universal availability of publications (UAP) has a rationality which appeals and facilitates teaching. Moreover, it is not only theory one is dealing with : it is institutional and organisational structures in the real world. In this sense, theory and empiricism are matched, and the world view, or paradigm holds together.

My worry - in relation to teaching - is that these structures and mechanisms which have evolved to handle printed and published books (maps, music ...?), mostly do not and arguably cannot encompass other

forms of recorded material, most particularly of the "electronic" kind. We probably all accept that the unique secular or lasting role of librarianship has been to collect, preserve, disseminate and transmit the textual images of civilization, with the outward and visible service at any time being to provide access to knowledge records. In very broad terms it may be seen as to do with culture and "racial memory."(3)

In noting, in a very potted way, how librarianship as a profession developed, let us go back, not so far as Gutenberg, but to the nineteenth century. Think of the new machine-press technology which developed from the Industrial Revolution, and of the production of masses of books and spread of mass education, mass literacy, mass suffrage. Let us consider authors writing and people reading, and the organisations and men in the middle. It is possible to see the new printing technology as a motive force in the constituting of a cultural field dominated by economic factors.

Authors wrote, and got some remuneration after literary agents, printers, publishers, booksellers, proprietors of subscription libraries derived income, perhaps profit. There was a good deal of conflict and confusion over literary property and piracy for decades, cleared up somewhat (though not once and for all), with the banding together of authors and the enactment of copyright legislation internationally, late in the century.

People read: what, and how much, depended on their intelligence, interest, levels of literacy and education, their leisure and their purchasing power. Not the intelligence, but other discriminatory factors, (especially the last) were mitigated eventually when the provision of government-supported free libraries came about - service units, a public good, and existing as the outcome of political processes. This piece of antiquarianism will be picked up later.

As libraries were established, the people who managed them professionalized. It is said that professions, as distinct from mere occupations,

have a body of knowledge to draw from. This body has to be nurtured - trimmed off, fattened up, spread about, which is particularly what academics should do as well as teach. For librarianship, this body, which had its growth spurt in the nineteenth century, started life in the fifteenth, as bibliography, with the development of methods for keeping track of books, namely :

- listing what existed (enumerative bibliography);
- setting down the attributes (analytical or descriptive bibliography);
- tracing relationships between versions of texts (historical bibliography).

These bibliographical activities were done within the booktrade and by scholars. Only later did librarians take over, with cataloguing and classification and under the aegis of the state, with the development of legal deposit and national bibliography - part of the culture of nation-states, as underscored in IFLA/Unesco programs for universal and national bibliographic control of the 1970s. This thread also will be tied in later.

Now to the present, with the computerisation of text and the revolutionary advent of electronic publishing. Frank Thompson of the University of Queensland Press, speaking at the 1979 LAA Conference, said that reference books would be the first to go "into the computer".(4) He spoke in a scholarly book publishing context. Of course abstracting and indexing services were earlier, but the point is that textual information which requires a lot of updating lends itself most readily to computerisation, and though this was used at first for computer typesetting, it now seems that this, inexorably, is changing. Outputs may or may not be published editions. They may be on-demand prints. The output form may be only or chiefly online access. The only thing one can say for certain is that the amount of text held in machine-readable form is growing. (The Australian Database Development Association survey now being conducted will give a snapshot of the end of 1983 situation in Australia.)

What I want to stress is that, to the extent that a work is "held" in machine-readable form, the science of the transmission of texts and therefore the whole practice of historical bibliography become drastically altered if not largely irrelevant. So too does the infrastructure of LRC - legal deposit, national bibliography, and so on. At the ALA Conference in San Francisco in 1981 Maurice Line of the British Library Lending Division spoke of the diminished volume if not demise of what he called POP (print-on-paper) in a post-technological society. His seeming evasiveness in view of the inferences to be drawn about national libraries was a bit surprising.

In trying to make some sense of change I shall try to discern some outlines in the emerging cultural field in which author, or rather, information generator is linked, with the support and use of computer-communications technology at virtually every station, to reader, or rather, end user. I see entrepreneurs in the shape of database producers and online hosts (sometimes one and the same), holding resources and possessing if not totally controlling the technological means for production and for access. I see (as we all do : it is a key theme in addresses at this conference) competition and power play centred on data ownership and manifest in issues like downloading and charging policies. I see self-styled information brokers coming into the picture (like subscription libraries of the earlier model?). I see end users accessing databases provided they have the requisite intelligence, interest, education, literacy, online search, retrieval skills, and purchasing power. I am conscious that this has the makings of a simplistic, misleading market forces model, that a more valid representation would include regulatory, subsidising and supportive activities of governmental agencies. In an Australian context, I am unable to make much sense of how and where these are operating; nor do I see a unique or distinctive role for libraries in this field. Like so many speakers at this conference, I do see the need for state support of access to information resources, though not clearly what forms this might or should take.

These forms are yet to evolve, and the process will be above all a political one. And Australia will get what the powers that be are

pressed and see fit to decree and what the electorate will wear. Who is to bargain and negotiate, and for what? Librarians don't help much by simply bleating that information should be free, anymore than doctors can usefully say that of health, or lawyers of justice. Though all doctors may see being healthy as axiomatically good, some may favour and want to work for and with welfare medical sources. Not all. Some may be independent fee-for-service professionals; some may indeed charge high fees for cosmetic surgery. The academic analogy - with emergent information professionals - could be pursued. The actual lobbying calls for acumen as well as awareness.

What I am driving at are related but separate matters of professional ethics and personal political commitment which were raised implicitly by Brian Abbey, an outsider to librarianship, at the LAA Conference a year ago.(6) The message I received from his address was that, in confronting and adapting to change, as individuals who have been working as librarians we have ideological choices to make in relation to our continuing careers, perhaps for the first time. As opportunities shrink in our safe apolitical world we need to see ourselves and our personal beliefs and futures in relation to the means of production of the knowledge records with which we are occupationally bound up. Crudely put (to highlight the choices) - joining forces with those who have the means, and make money therefrom; or mitigating if not preventing exploitation; or being pushed by technological developments ... As we move from a professional world centred on handling books in libraries to an environment where corresponding aspects of dealing with "information" are dispersed to a spread of loci we have to make choices and help to create opportunities.

Leaving aside these large issues, I would like to comment briefly on two adaptive responses I see taking place. The first is attempts at image improvement, the promotion and marketing of ourselves and services, including changing names of positions, courses, schools. These alone do not get to the bottom of the matter of transition; at worst they can be wasteful and silly.

The second response is to stress management. It is evident in the adoption of management theory, practices, styles; seen in staff

development programs, formal curricula, conference themes. It is seen in new requirements for senior positions - managerial expertise rather than specialist knowledge. Management is a necessity and also a trend. But it is not a total panacea. Funeral directors now study grief management in formal courses, as part of bereavement studies; this is not the be-all and end-all of handling death, either the practical aspects or the associated emotional ones. In information transfer there is much to be managed, not least the resources containing the meaning, which is where specialist professional knowledge may be called for.

The structures for archiving and listing will have to evolve in relation to materials to be listed, described and authenticated and in relation to the resolution of legal matters of data ownership and technical matters of storage and output media. A thought - magnetic disc files can be overwritten but digital optical cannot: the latter could turn out to be a legal deposit medium ... Society may find its ways. As the origins of national bibliography may be traced to listing activities in the booktrade and academe so may the database lists and directories emanating from the information industry and interested academics be precursors of more formalized arrangements for "bibliographic control" of computerised sources.

The question of access and access strategies is more tractable, though demanding. Access, particularly subject access methods is a topic calling for substantive research, both in book-based library automation and in information technology applied to machine readable databases. OCLC worked for years to produce a very simple search algorithm for online cataloguing. That is not the secret of its success, but it is a large factor, I suspect. Methods developed in librarianship are outmoded; much can be learned from research and development outside conventional librarianship. Library schools could do much more; library educators have tended to interpret rather than innovate. A pity, because advances in this area could, if anything, assist if not effect the professional shift to the new information environment, could constitute a knowledge core and theoretical base for transitional professionals to draw and build on.

In conclusion I'd repeat that it isn't easy to work with old "certainties", perceiving they aren't going to suffice yet cannot be ditched, and not being certain at all about what shape or form the new computer-communications based knowledge records will settle down to, if indeed they do. Some orientation may come from historical parallels: nineteenth century struggles over rights to own and profit from literary property - compare the data ownership bid of OCLC; movements for government supported free libraries - compare the need for, if not the fact of, government support of production of and access to computerised databases, and so on.

My own response, in this awkward situation between the old and the new, the dominant and the emergent, is to aim for a wider and longer look at the real world in which we library professionals have, until relatively recently, lived safely but may now have outstayed our time. If a profession of information management is to establish itself and grow, it needs, among other requirements, a cohesive body of knowledge. I suggest that studies in the politics of culture and the economics of literary production could help to shape it.(7) Such a profession would, to my mind, call for the sort of cognitive skills that librarians have had, and, in my unease, this is the one <u>real</u> glimmer of hope. What I suspect though, is that, with choices ranging from pushing technology to being pulled by it, to be an intelligent, willing worker will not suffice.

1. SMITH, A. Goodbye Gutenberg. Oxford, OUP, 1980.

2. KUHN, T.S. The structure of scientific revolutions. 2nd ed. Chicago, U. of Chic. Press, 1970, p.176.

3. As expounded by Pierce Butler in An introduction to library science. Chicago, U. of Chic. Press, 1933.

4. THOMPSON, F. "The endless present." Alternative futures: proceedings [of the] Library Association of Australia 20th Biennial Conference, pp.150-61. Sydney, LAA, 1979.

5. LINE, M. "Libraries and information services in a post-technological society." Journal of library automation, v.14, no.4, December 1981, pp.252-67.

6. ABBEY, B. "The social impact of the new technologies." Challenge and response: proceedings of the 22nd Biennial Conference of the Library Association of Australia, pp.311-23. Sydney, LAA, 1983.

7. Not necessarily written by or for librarians, for example: WILLIAMS, R. Culture. Glasgow, Collins/Fontana, 1981; GEDIN, P. Literature in the market place. London, Faber, 1982.

Open address
VALA, November 30, 1983.

Online catalogue development: the Guelph experience.

Abstract:

The environment of online catalogue development in the United States and Canada is described as well as the relationship of the University of Guelph Library to that environment. Criteria for online catalogue design are identified and the Guelph response to these is described. A specific discussion of the data base engine concept is included.

Margaret Beckman,
Chief Librarian,
University of Guelph,
Guelph, Ontario, Canada.

Online catalogue development: the Guelph experience.

I. Introduction.

The past two years in North America has seen a plethora of library conferences, meetings, workshops and papers on online catalogues, and a variety of issues have been raised with the verdict still undecided on the correct or definitive solution. On the one hand there are extensive specifications developed for online catalogues by groups such as CONDOC (Consortium to Develop Online Catalog)[1] with no attention paid to cost. Pauline Cochrane complicates issues by insisting on controlled thesauri and search refinement for subject access.[2] At the same time Carole Moore[3] and Carolyn Pawley[4] rely on user surveys to illustrate that the online catalogue users are looking for quick easy access to bibliographic, location and status information on one terminal. With such diverse views it is indeed difficult for the individual library to decide what path it should follow. Unfortunately, many libraries do not even have that choice, with decisions forced upon them by their own choice of a commercial vendor; their dependence on a bibliographic utility; or their sense of responsibility to a regional or national resource network.

There are, as I suggested in my address earlier this week, some issues still outstanding:

- centralized vs. distributed networks;
- relationship of bibliographic control to the local system;
- subject access: controlled vs. free vocabulary;
- user needs vs. network requirements;
- cost.

It is in the context of these issues that I would like to discuss online catalogues and the specific response of one library - the University of Guelph - to them.

II. The environment.

It is important to remember that the Canadian academic library environment is substantially different from the American, and the Canadian response to online access and library networks has taken a divergent direction. Many academic libraries do not belong to a formal bibliographic consortium or receive bibliographic processing from a central utility. In the province of Ontario, where 15 of the 40 university libraries in Canada are located, a cooperative library system, with no formal structure or central office or staff, operates an inter-university transit system, reciprocal borrowing or inter-university borrowing systems, union serials list system, and cooperative document processing and union list system, among other projects. Six of the libraries have implemented Geac online circulation and inquiry systems and have or are planning to implement the complete online catalogue module. Access to each other's online catalogue is available through Datapac, the Canadian packet switching network, or through the iNET Gateway system provided by Trans Continental Telephone System. (TCTS) Libraries acquire bibliographic data from the National Library, or through running their own copies of MARC tapes, directly from each other's data base, as well as from a bibliographic utility or a commercial vendor. The costs associated with centralized or standardized consortia have been to a large extent eliminated if one so desires.

Admittedly some provinces, most notably British Columbia which has 3 universities, have attempted a union catalogue approach for online access to each other's collections. However, as Richard de Gennaro points out, the loss of state (in this instance, provincial) funding forces network members to rely on their own resources and this may lead to a re-evaluation of the costs and benefits of cooperation.[5] That is what has happened in British Columbia, and the future of their network is in a precarious position as the provincial government removed its financial support.

The University of Guelph Library is not un-typical of many Canadian university libraries. We maintain our own database, some 1,200,000 records, (800,000 MARC, 400,000 non-MARC for documents, archives and other variant materials) on a Geac 8000 computer with 1,000 megabytes of disc storage, and access other library databases via Datapac or the INET gateway. We use electronic messaging for interlibrary loan and document delivery purposes with the National Library, CISTI, or other university libraries across the province and country when possible. We receive most of our catalogue copy form MARC tapes purchased at minimal cost from the National Library of Canada and incorporated into the Guelph cataloguing and acquisitions systems.

The University of Guelph Library has had an online public inquiry system as part of its Geac circulation system since 1977. Consistent with a move toward a complete online replacement for the card and microfiche catalogues, a survey of user responses to the online inquiry module was conducted in 1980/81. The results have been described in detail previously,[6] but very briefly the study revealed that 80 per cent of the users surveyed enthusiastically endorsed the 'online catalogue' already available, preferring it to the more complete card or COM catalogues with which it was compared in the study.[7]

It is important to realize exactly what was available in online inquiry.

- a brief record, giving author, title,date, edition and call number.
- government publications catalogued in a non-MARC format and with non-Library of Congress classification.
- access by author (personal or corporate).
- access by title.
- access by call number (either L.C. or document).

The only major complaint which the Guelph users - both faculty and students - had about this system was that there were insufficient terminals. Although lack of L.C. subject heading access was noted as a deficiency by some users, 88.1 per cent of all those surveyed found the information they were seeking, and preferred online inquiry - incomplete as it was - to either card or COM/fiche catalogues. In terms of ease of use, although 80 per cent of students felt the terminal was easier to use than the card catalogue, it is interesting to note that even faculty members - 50 per cent of them - concurred with that assessment.[8]

As a result of this experience and this and subsequent user surveys, both formal and informal, Guelph developed its own set of requirements for an online catalogue. Two factors were considered of paramount importance: user needs (or perceptions) and costs.

The most important considerations from the user viewpoint continue to be:

(i) terminals in sufficient numbers to eliminate waiting.
(ii) response time of one second. (Maximum of two seconds is considered tolerable).

A third characteristic is given equal importance if any attempt is made to eliminate it:

(iii) all material in the Library must be accessible through one terminal. Further studies of this characteristic at Guelph revealed the crucial nature of this feature: students will only look in one place.

Other user criteria are as follows:

(iv) subject searching is needed, but more emphasis should be put on Keyword concepts than on a controlled vocabulary such as the Library of Congress subject headings. In fact sophisticated users, either faculty members or the very computer literate, have asked for a true thesaurus with natural language as opposed to headings.

(v) authority control is also needed, particularly for names. This has been determined by the problems students have with entry, and it is difficult for them to either express the problem or to articulate the solution. Guelph's solution to this problem is discussed below.

(vi) other access points. Most users found a need for more access points than a simplified record supplied. Added titles, series title, added authors, corporate authors are all needed, if only to assist in the likelihood of a quick, positive search.

(vii) date. Full collation and imprint has never been missed. Date of publication is the only essential part of those two descriptive elements from the user view point, although the online catalogue system will provide the option of a complete bibliographic record.

(viii)printing capability. Both faculty and students have requested capability for printing out the result of their searches.

Knowledgeable faculty members and graduate students have added two more requirements to this list.

(ix) on order and in process record access is of course available to the staff but faculty members wish this capability as well.

(x) link to other libraries. The interlibrary loan function is now performed in large measure via electronic messaging, and direct links to the library data base at nearby universities have proven most effective. Faculty members and graduate students are now requesting the same privilege of direct access to other library data bases, since reciprocal or interuniversity borrowing is not difficult in a relatively small commuter area. (i.e. 50-60 mile radius).

These criteria contrast in large measure to those proposed by various American agencies or writers. For example, CONDOC has proposed the following first priorities for online catalogue development:

(i) System reliability greater than 98 per cent of scheduled time.

(ii) Data base contents - monographs, serials and other MARC formats.

(iii) Call number access to the data base (author, title, subject assumed).

(iv) Authority Control File (with cross references) manipulation (add, delete, modify, and Global Search and Replace).

(v) Key word or key term access to title and subject headings.

(vi) Authority Control File - name and subject headings with cross references.

(vii) Information Display - copy location information provided.

(viii) User interface - standard CRT terminal with menu display and a command language.

(ix) Response times average less than 5 seconds, maximum of 10 seconds.

(x) Data base contents - monographs and serials.[9]

As you can see there are great differences. However, the most important difference relates to cost. At Guelph we feel that cost should share an equal priority with user needs. CONDOC lists cost as 25th out of 40 requirements.

Including cost implications in the design of an online catalogue forces consideration of all the major issues identified earlier. At Guelph we have insisted that any online library system must provide for a reduction in total staff, require a minimum of staff oriented operating procedures, and be affordable within our existing operating budget. Not only do the librarian's requirements listed earlier fail to recognize the user requirements of simplicity and very rapid response, but the emphasis on standards, structure, and on authority files will add considerable cost to the local system.

One of the most important cost considerations relates to the contents and structure of the data base, and this can be explained by describing a problem facing most of the Ontario university libraries. We all use an automated documentation system for organization and control of government publications, technical reports, theses, and archival records. (CODOC) A union file of more than one million document records is created on CAN/OLE, the national online retrieval system, or in a COM/fiche catalogue which is distributed widely. Access to the

collections represented, including each individual document or item, is through personal and corporate author, individual and series title, and through a keyword and enriched keyword index that is all encompassing. At the local level, each university library processes and maintains its own document file and, if it has an online access system, merges these records with standard MARC records in one data base, making no attempt to impose authority control or cataloguing standards on them.

Similarly, the Ontario universities have developed a successful automated system for serials, and many have local systems for other special formats such as maps and atlases. To lose the in-depth access to these materials that is now available appears a retrograde step. The cost of cataloguing all variant materials into a MARC/AACR2 environment would be prohibitive as well as unnecessary.

The common American research library approach to these problems has been to either catalogue all materials using AACR2/MARC and include them in the data base, or to maintain separate files and access systems. In actual fact this means, for example, that few American university libraries are providing access to government publications through their card, online or COM catalogues except for those few documents that are catalogued, usually as serials, at the Library of Congress. This action defeats one of the user's first requirements for an online catalogue: integrated access to all library collections in one access system.

This integrated access question forces us to define a local library's relationship and responsibility to networks, as well as decide how much control or standardization is necessary and affordable. We are also to some extent, facing

the problem of whether online catalogues can and should be based on the same principles which dictated the structure of card catalogues:

- location tool;
- relate all works of one author.

Henriette Avram, among others, feels very strongly about the importance of the relationship principle,[11] and in the context of one centralized data base of bibliographic control system that can be understood. In the local library environment this can, in my opinion, be questioned.

The other major cost in implementing an online catalogue relates to hardware. At Guelph we have found it necessary to add a second Geac 8000 computer and two disk drives to the configuration. In addition, there will be a total of 50 terminals available for public access within the Library. (The Library is not responsible for the 1,000 terminals elsewhere on campus which can access, remotely, the Library system). Maintenance on the hardware must be viewed as an important factor in online catalogue costs, and any mechanism which will reduce those costs should be considered.

III. The University of Guelph Library.

The University of Guelph has adopted the following approaches to all the requirements and cost considerations outlined above.

1. We have implemented the Geac online catalogue module, which gives a very good replacement for the card catalogue, meeting most access and response needs of the users. The system - or user screens - is quite well designed, so that the system needs little or no instruction. Guelph students are given a one page brochure that is intended to familiarize them with a computer terminal as much as with the system itself. The help screens or help defaults provide better instruction than staff members could give in most specific situations.

2. While this online catalogue provides single term searching, meeting the need of the non-book formats in the Guelph data base, it is obvious that sophisticated keyword searching, linking terms or phrases, a stop list for some words, etc., is essential. Guelph and Geac staff are now working together to develop this capability. Proximity searching, false hit, natural language thesauri and dictionary concepts are being considered as well as standard Boolean operators. This additional capability should be added to the Geac online catalogue early in 1984.

3. The problem of the non-standard or non-controlled entries from the 400,000 document and archival records is being addressed in a different manner. If a Library has used, as have most American and Canadian academic libraries, Library of Congress records as the basis for their catalogues, either machine or card, they will have the Library of Congress authority structure, de facto, built into their own catalogue. It is common sense to use what has been provided, and to record any deviations from that structure.

For example, Canadian libraries do not accept the Library of Congress classifications for Canadian history and literature, or its subject headings for such Canadian/American controversial issues as the War of 1812-14 provides. These Canadian deviations from the Library of Congress would be recorded in each library, with dependence on files or schedules supplied by the National Library. In an automated library system, the structure of the local data base itself becomes the local authority file.

However, if you introduce, as Guelph and others have done, non-standard, non-related names into the data base, what results? We have maintained the first principle of the card catalogue - a location tool - but we have violated the second principle.

John B. Black, an author established by the Library of Congress would not file near to, let alone with J. Black, the same author of a technical report in our system. And yet to meet the criteria of the user - access to all collections in one place - as well as of cost - recataloguing of all documents into MARC/AACR2 - a compromise must be found. The Guelph solution to this problem may not be acceptable to all, but we feel it responds in appropriate fashion to the dilemma of variant formats and cataloguing. We are placing a unique identification tag on all non-standard or non-authority controlled entries. A computer program places such a tag on all existing entries in the document or other non-MARC files. A message in the online catalogue information sheet will inform the user that this tag means that this author (i.e. J. Black) may be the same as other authors with similar name, but the Library has not made the effort to identify that fact at this time. In other words, we are accepting the fact that the primary purpose of online catalogue use is as a location not a bibliographic tool, and are placing the onus on those users who require a perfect bibliographic response to pursue it for themselves. We feel we will be meeting the basic needs of more than 95 per cent of our users with this decision. We are also not saying that we will NEVER provide a linkage between those entries not under authority control and those that are. At sometime in the future this may be possible, but at this time it is not necessary.

4. The hardware costs are also being addressed. Geac and Guelph have determined that independent hardware is cheaper, and progress is being made toward the joint development of the library data base on a relational data base machine. This development will greatly reduce response time concerns, as well as reduce the cost of the hardware necessary for mounting an online system of the complexity demanded in a university library environment.

The relational data base machine or data base engine which Guelph and Geac are currently working with is INTEL, although other data base machines are being developed and may reach the market within the next 12 months. The basic concept of the data base machine is that it takes over the control of the disk drives, therefore removing from the c.p.u. (central processing unit of the mainframe or mini-computer) all of the cycles required to service the disk sub-system. In addition, the data base engine does a great deal of the query processing, so that the only information that is transferred back to the c.p.u. is the search results. In other words, the c.p.u. can be used entirely for the interactions between the terminals and itself, while the data base engine manages the data base, totally:

- creation of indexes;
- updating of indexes and data base;
- back-up and recovery routines for data base

etc.

Such a concept reduces the cost of the hardware requirements for an online catalogue because it is the latest generation of V.L.S.I. (very large scale integrated circuit) computer technology. This means that the necessary computer power can be provided at lower cost than previously.

To give some perception of the kind of hardware being discussed, let me describe what has happened to data base machines in the past six months. The first INTEL data base engine at Guelph was the size of a small refrigerator; the present one is the size of a T.V. set (portable); and it will soon be available as two(2) circuit boards plugged into a terminal.

5. Local vs. union catalogues.

The issue of union vs. local catalogues is also reflected in online catalogue design. As stated previously, the primary requirement of an online catalogue for most university library users, i.e. students, is access to material needed immediately for course or research purposes. Knowing that a needed title is in the library is not entirely useful unless it is also known if that title is available; that is, not out on loan, at the bindery, or in the rare books stacks and non-circulating. Equally obvious, determining that a desired title is at another university is not an important consideration unless:

- the status of the book is also known;
- the university is close enough to drive to and there is a reciprocal borrowing arrangement;
- or, there is a special interlibrary lending system that will deliver the wanted title within a few days.

Most of these conditions do not obtain for most of the universities in Canada. For Guelph students there are five universities in close proximity and there are reciprocal borrowing arrangements with only three. Far more important to Guelph students than a union catalogue of Ontario or Canadian library holdings, therefore, is direct access to the catalogue and status information of these three libraries. This access can be satisfied by either going through Datapac directly to the other library catalogue, or by going through iNET. In either method, status as well as holdings information is available, so that a student doesn't drive 25 miles only to find the title out in circulation. One of our next projects will be to provide a hold or reserve function from one library to another, a natural extension in our present university network.

Such concepts would not be feasible in a closed network based on a union catalogue. One of the difficulties that has faced OCLC, for example, is that it is impossible to link the constantly changing status from 3000 libraries to 8,000,000 records. Authority control in this environment is equally difficult, as well as expensive.

6. Vendor vs. local system.

A final word should be said about the use of a standard vendor system as opposed to a local 'home-grown' system, for this also relates to the costs; costs of maintenance in particular. The cost of investment in a complex design and development such as an integrated library system puts a heavy burden on an institution that tries to maintain its own software. Although all the desired enhancements - the bells and whistles - may not be achievable with the vendor system, a variety of options should meet most requirements and allow a library some measure of uniqueness at a price it can afford.

IV. Conclusion.

In response to the issues which were identified at the beginning of this presentation, online catalogue development provides exact and necessary conclusions, at least from the perspective of one Ontario university library:

1. A centralized network cannot respond to the location/status linked information required by users; the distributed network can.

2. Bibliographic control can be introduced to the local online catalogue at a cost and with a methodology that each library can determine for itself.

3. Controlled subject access supplied through subject headings is insufficient. A keyword and free vocabulary access system is essential.

4. The needs of the user should take precedent over network requirements; but an open system interconnection network (OSI) such as iNET, satisfies both.

5. Costs are of primary importance in online catalogue development and libraries should constantly re-evaluate newer technologies and ensure that their system is operating in the most cost efficient manner possible. New disk storage devices, more powerful processors, and relational data base machines are but a few of the devices that can bring online catalogue costs down as well as increase their effectiveness.

References.

1. Matthews, Joseph R. Requirements for an online catalog. Technicalities, 1. October 1981. p.11-13

2. Cochrane, Pauline A. Subject access in the online catalog. Research libraries in OCLC: a quarterly. No.3, January 1982. p.1-8.

3. Moore, Carole Weiss. Reactions to online catalogs. College and research libraries. V.42, no. 4, July 1981. p.295-302.

4. Pawley, Carolyn. Online access: user reaction. College and research libraries. V.43, no.6. November 1982. p.473-477.

5. De Gennaro, Richard. Library automation and networking: perspectives on three decades. Library journal. April 1, 1982. p.632.

6. Pawley. Online access. op.cit.

7. Ibid.

8. Ibid.

9. Matthews. Requirements. op.cit.

10. Ibid.

11. Avram, Henriette D. Authority control and its place. Journal of academic librarianship. Preprint. January, 1984.

CSIRO Central Information Service/VALA Technical Workshop on Microcomputer-based Information Retrieval Packages

Workshop Report

Compiled by: Dr Grahame Jackson
CSIRO Central Information Service
314 Albert Street East Melbourne Vic. 3002

CSIRO Central Information Service in conjunction with VALA organised a technical workshop on information retrieval packages suitable for use on microcomputers to coincide with the Second VALA National Conference.

The workshop was limited to some twenty invited participants who had already had 'hands on' experience with microcomputer systems and six invited 'observers'.

The workshop was held at CSIRO at 314 Albert Street, East Melbourne on 1st December 1983. A workshop programme is given in Appendix 1.

The general aim of the workshop was to exchange experiences gained from using information retrieval packages on microcomputers and specifically to:

(a) establish guidelines for evaluating information retrieval software packages for microcomputers;

(b) consider factors influencing operating system selection (time limitations prevented any detailed discussion regarding operating systems at the Workshop, but brief comments are included so that the importance of operating system selection will not be overlooked).

(c) establish guidelines for hardware selection for information retrieval applications on microcomputers.

A listing of the participants and a brief summary of their presentation is given in Appendix 2.

Guidelines for Software Evaluation/Selection

Following general discussion of the problems of software evaluation/selection there was general agreement that there was no universally applicable package for information retrieval and that the overall system must be considered in terms of its three components -

ie, application software
operating system
hardware

A range of options is thus available to users:

(a) write your own software in-house;

(b) purchase an existing commercial package, e.g. EAGLE, Scimate;

(c) purchase a package and enhance its information retrieval capabilities by writing additional user code, e.g. DBase II and DBase II macros;

(d) purchase a package and augment its information retrieval capabilities by coupling features of the microcomputer operating system, e.g. DBase II and Cromen.

In an effort to obtain some concrete evaluation/selection criteria discussion was then limited to textual information retrieval packages and the following criteria were seen as being of interest:

GENERAL FEATURES

1. Interactive -- ESSENTIAL -- if not discard!

   if so program driven, e.g. Dbase II

   command driven, e.g. DIALOG

   menu driven, e.g. EAGLE

2. Record length variable?

3. Adequate number of records per file?

4. Adequate number of fields per record?

5. Field length variable?

6. Can fields/records be changed? ie, is it possible to redefine file structure?

7. Report generator included?

8. Sort package included?

9. Multiple users possible?

DATA ENTRY FEATURES

Input means - interactive?

- menu driven?
- batch/bulk loading?
- via telephone lines?
- optical character recognition?
- special input media?

Updating time lag? ie, delay in index generation?

Editing - record by record?

- field by field?

- line by line?
- word and character?
- global changes possible?

Flexible screen formats for data entry?

OUTPUT FEATURES

Flexible report writer?

Report writer easy to use?

Report formats supplied?

Data base sorting features

- alphabetic variations?
- separate sequences?
- numeric?
- other?

Copies files for backup purposes?

Outputs selected fields/records?

SEARCHING FEATURES

Natural language?

Commands easily remembered?

All fields searchable?

Selected fields searchable?

Can these selected fields be changed later?

Boolean logic? ie, AND/OR/NOT

Saving sets? Combining searches?

Truncation? Left/Right/Embedded

Sequential or index (inverted file) searching?

Speed of searching?

Storage of searches?

String searching?

Expand command?

Search interrupt feature?

Search restart feature?

USER FRIENDLINESS

Ease of learning?

Error messages clear?

Screen presentation adequate?

Documentation clear?

Different levels of documentation?

TRAINING

Amount required?

Training supplied by distributor?

Training available elsewhere?

Expertise required by users?

COSTS

Cost?

Maintenance costs? Product support?

Compatability with existing hardware?

Other uses of software for different areas?

FILE MAINTENANCE FEATURES

Production of statistics?

Index printing option?

File backup options?

HARDWARE COMPATIBILITY

While no information retrieval package will display all these features the above list should allow a scale for comparison and allow users to systematically 'trade-off' features when forced to select from a given list.

Microcomputer Operating Systems

In general it is found that -

(a) many application software packages are available under one operating system only, whereas some popular application packages are available for several operating systems;

(b) some microcomputers can support several operating systems - but only one at a time;

(c) files written to disk by one operating system on a given microcomputer will not be readable using another operating system on the same microcomputer.

For example, with the IBM PC the choices are:

PC-DOS XENIX MS-DOS	written by Microsoft
CPM/86 MPM/86 Concurrent CPM/86	written by Digital Research

Concurrent CPM/86 allows several programs to be initiated from the terminal such that a report generator program and a data base search program could be running concurrently.

A more sophisticated product than CPM/86 is Microsoft's XENIX (a version of Bell Laboratories' UNIX) which is similarly a multitasking system.

If the desired application software is only available under one operating system then there is no decision required.

If however, the application software is available under several operating systems the decision should be taken realising that the most popular operating systems are those with the greatest future as they receive the most attention from software writers and it can therefore be expected that further enhancements to the package purchased will be forthcoming.

Guidelines for Hardware Selection

Michael Staindl (Australian Road Research Board) outlined the many hardware features which should be considered before purchasing any microcomputer equipment.

Following general discussion the workshop participants found difficulty in defining a minimum hardware requirement for each criteria and decided instead to list the criteria to consider and to recommend a preferred option:

1. Bus vs Dedicated Board

While a dedicated board was seen as the minimum option the workshop felt that the advantages inherent in a bus in facilitating system upgrades made it the preferred option over the longer period.

2. Multi User vs Single User Environment

Whilst having obvious hardware demands this option was seen to be very application dependent and should be considered as a feature in software evaluation.

3. 8 Bit vs 16 Bit Microcomputer

Currently an 8 bit microcomputer was seen as the recommended option to give users access to the larger pool of software. However, this situation may soon reverse. It was also noted that the DEC Rainbow 100 microcomputer supports both 8 and 16 bit software and that an optional board is available for the IBM PC to allow it to handle 8 bit software.

4. Random Access Memory (RAM)

For the majority of applications 64K was seen as the minimum RAM for an 8 bit microcomputer. For a 16 bit microcomputer as much RAM as affordable should be purchased.

5. Hard Disc Storage

Essential for any serious attempt to handle any but the smallest of data bases. Generally available in 5, 10 or 20 Mbyte capacity. Whilst the requirement depends largely on application at 10 Mbyte hard disc satisfies most requirements.

A second problem with hard discs is that of back up - and ideally selective backup. Options which should be considered here include:

1. Floppy disks	2. streamer tape
3. cartridges	4. video cassette tape
5. removable winchesters	6. mainframe disks

6. Monitors

Colour or monochrome are the options with the monochrome monitor being the minimum requirement unless a particular application demands colour. In this case it should be remembered that 7-10% of the male population are colour blind and that a similar effect may be obtainable using a bold/non-bold display on a monochrome monitor.

7. Printers

Considered essential for the majority of applications with the amount of money invested being application dependent in regard to print quality requirements. A print buffer is desirable in most cases, but not essential.

Library users in particular should pay attention to printer noise levels.

8. Communications Equipment

Choice lies between hard wired modems and acoustic couplers with the former being recommended unless portability is a major system requirement.

9. Maintenance Contracts

Such contracts should be carefully considered and not automatically accepted. Depending upon -

(a) the conditions of the maintenance contract,

(b) the cost of the hardware involved,

and (c) the projected life of the hardware,

it may be worth saving the cost of the contract and accepting the risk of hardware failure.

10. Hardware Compatibility

Unless there are overriding software factors users should attempt to purchase with a major demand/brand.

Conclusion

Whilst it was generally felt that a consideration of the above hardware/software characteristics would greatly assist in the selection of appropriate systems the following additional points were made:

(a) There is a lack of objective benchmark tests for information retrieval software and that such tests should be developed;

(b) a 'standard' data file should be prepared on which software vendors can demonstrate their projects to facilitate software comparisons. The file could be presented to a vendor well in advance of his proposed demonstration. The vendors 'ability' to adapt the file to his software would be indicative of his depth of understanding of his product - an important consideration for novice users requiring significant vendor product support. VALA could investigate such a file for their 1984 'vendor demonstration' programme.

(c) Both participants and observers felt that they had benefited from the 'experiences shared' at the Workshop and felt further Workshops would be worthwhile. In view of the anticipated explosion in microcomputer applications in library/information fields in 1984 such workshops would have to be application specific to restrict numbers to workable levels.

Appendix 1

CSIRO Central Information Service/VALA Microcomputer Workshop

314 Albert Street, East Melbourne

9.00 am - 4.00 pm Thursday, 1 December 1983

Programme

9.00 - 12.30	Series of 10 minute presentations from participants outlining relevant experiences with information retrieval packages on microcomputers. (Details attached).
12.30 - 1.30	Lunch
1.30 - 4.00	Mr Michael Staindl (Australian Road Research Board) and Mr John Shortridge (CILES Systems and Development Group) will lead general discussion covering: (a) establishing guidelines for minimum hardware requirements for information retrieval applications on microcomputers; (b) establishing guidelines for evaluating information retrieval software packages for microcomputers; (c) identifying major topics for consideration at the 1984 VALA microcomputer workshop.
5.00 - 7.00	Closing function of VALA Second National Conference on Library Automation at St Hilda's College.

Participant	Presentation Summary
Mr Kevin Hall Division of Chemical and Wood Technology, CSIRO Private Bag 10 CLAYTON VIC. 3168	Outline of some factors to be considered in defining the requirements for a multitask microcomputer system for a CSIRO Division.
Dr Finlay MacRae Department of Gastroenterology Royal Melbourne Hospital P.O. Royal Melbourne Hospital VIC. 3050	Use of Datastar and Formgen software for data collection/retrieval relating to clinical gastro-intestinal research needs. Hardware: British Comart Communicator
Ms Margaret Irvine Department of Agriculture Victoria 166 Wellington Parade EAST MELBOURNE VIC. 3002	Use of Dbase II and GLOBEPASS subscription control system. Also library catalogue automation evaluations. Hardware: Micromation M/System, GED Mark III
Dr G.L. Jackson Central Information Service CILES, CSIRO 314 Albert Street MELBOURNE VIC. 3002	Use of EAGLE and AQUILA information retrieval packages for small/medium bibliographic data bases and research in progress directories. Hardware: DEC Rainbow 100
Ms Liz Prytz Stockdale Prospecting 60 Wilson Street SOUTH YARRA VIC. 3141	Bibliographic indexing and retrieval system (SUPERSEARCH) for company reports. Hardware: CROMENCO
Ms Sue Collins Librarian Dairy Research Laboratory CSIRO P.O. Box 20 HIGHETT VIC. 3190	Use of CADAS to maintain directory of experts in the dairy industry. Evaluation of EAGLE for subscription data/bibliographic record retrieval.
Ms Virginia Westwood Australian Wine Research Institute P.M.B., P.O. GLEN OSMOND S.A. 5064	Bibliographic information retrieval of wine industry records using specially commissioned software from Abraxas Computers and Peter Hartley Software. Hardware: Commodore CBM8016
Mr Andrew Carter CRRERIS, CSIRO 314 Albert Street EAST MELBOURNE VIC. 3002	Use of Dbase II for bibliographic information retrieval of renewable energy literature. Hardware: IBM PC

Mr Dan Eaves CAVAL Suite 3, 5th Floor 792 Elizabeth Street MELBOURNE VIC. 3000	Use of CARDBOX as an information retrieval package for bibliographic material. Hardware: Beehive Topper
Ms Gail Keig Division of Water and Land Resources, CSIRO P.O. Box 1666 CANBERRA A.C.T. 2601	Use of FMS-80 for bibliographic retrieval of soil literature. Evaluation of Sci-mate proceeding. Hardware: DEC Rainbow 100
Mr Michael Staindl Australian Road Research Board 500 Burwood Highway VERMONT SOUTH VIC. 3133	Use of Dbase II and Datastar as information retrieval packages.
Mr Michael Wadsley Division of Mineral Chemistry CSIRO P.O. Box 124 PORT MELBOURNE VIC. 3207	Use of Dbase II in collection, storage and retrieval of thermodynamic data on slags and other metallurgical solutions. Hardware: CROMENCO-CROMIX
Mrs Glynis Vincent Industries Assistance Commission P.O. Box 80 BELCONNEN A.C.T. 2616	Use of Dbase II for cataloguing and periodical circulation system. Hardware: Sirius I
Ms Kate Alder Education Department 449 Swanston Street MELBOURNE VIC. 3000	Development of library applications for schools using various packages, e.g. FFS, DbaseII, Cromenco DBAS, BROAD, Apple DBMS. Hardware: various
Mrs June O'Brien Library Victoria College Rusden 662 Blackburn Road CLAYTON VIC. 3168	Use of INSEARCH information retrieval package in locating ephemeral publications as an adjunct to the library catalogue. Hardware: Apple II
Ms Shirley Bevan Technical Services Librarian New South Wales Department of Agriculture P.O. Box K220 HAYMARKET N.S.W. 2000	Use of GLOBE-PASS serial control system. Hardware: GED System 85
Ms Wendy O'Connor Technical Services Librarian Sydney College of Arts P.O. Box 226 GLEBE N.S.W. 2037	Use and development of SCAMPS circulation and search system in collaboration with Lothlorian Software. Hardware: Apple 2+, Apple 2E

The following people attended the workshop as 'observers' and participated in the discussions.

Mr Des Tellis
Manager - Information Services
Australian Mineral Foundation
Conyngham Street
GLENSIDE S.A. 5065

Ms Sue Harvey
CRRERIS, CSIRO
314 Albert Street
EAST MELBOURNE VIC. 3002

Mr Vernon Prior
Ministry for Economic Development
228 Victoria Parade
EAST MELBOURNE VIC. 3002

Ms Karen Harris
CILES, CSIRO
314 Albert Street
EAST MELBOURNE VIC. 3002

Ms Liz Davy
Division of Atmospheric Research
CSIRO
Private Bag No.1
MORDIALLOC VIC. 3195

Mr Tony Ermers
CILES, CSIRO
314 Albert Street
EAST MELBOURNE VIC. 3002

Mr John Shortridge
CILES, CSIRO
314 Albert Street
EAST MELBOURNE VIC. 3002

Mr Irving Chin
CILES, CSIRO
314 Albert Street
EAST MELBOURNE VIC. 3002